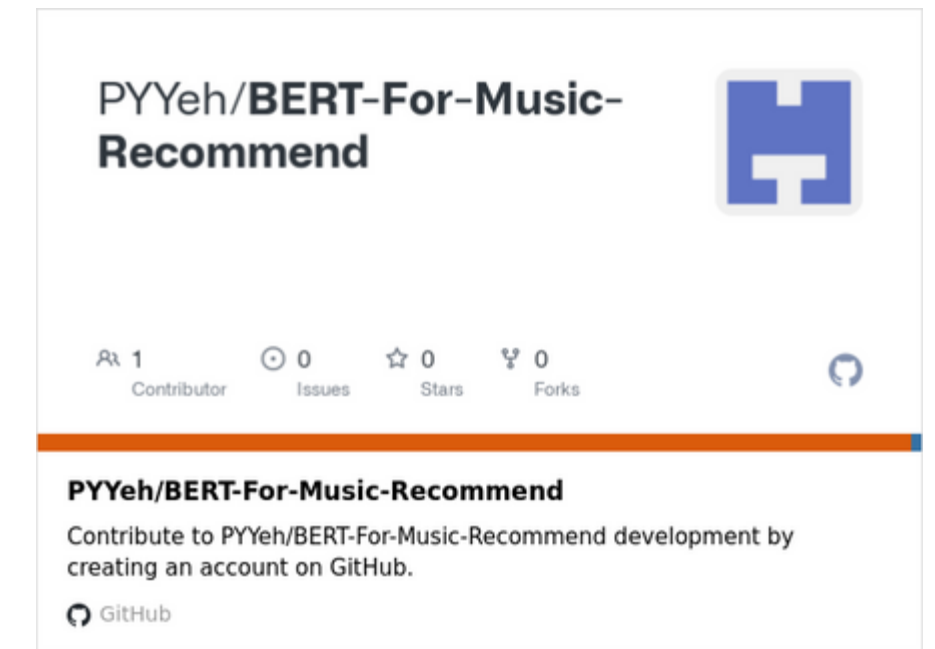


# BERT For Music Recommend

## Group 21

Po-Yu Yeh, José Maria González Abad, Una Sekulović



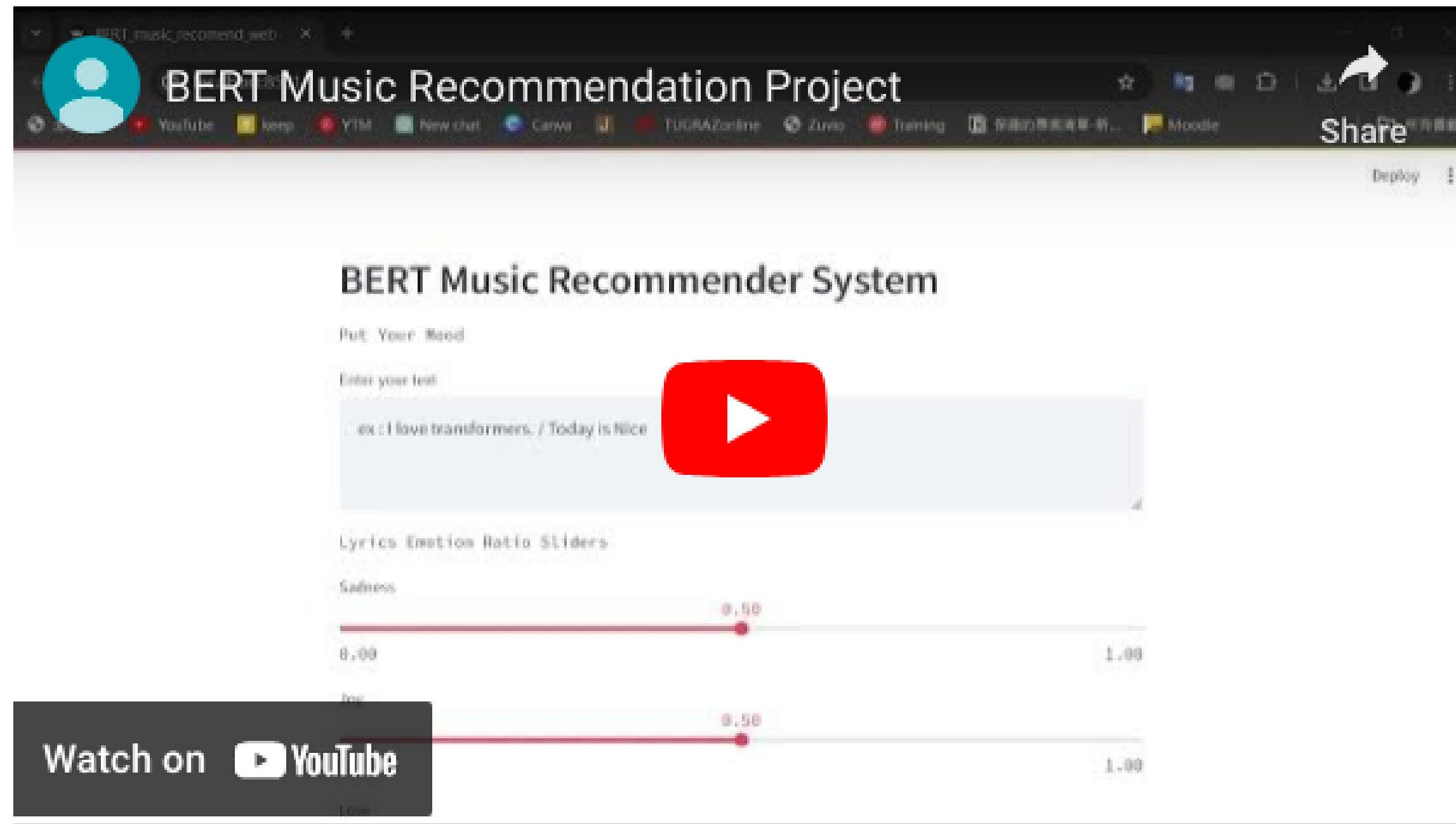
<https://github.com/PYYeh/BERT-For-Music-Recommend>

# Outline

- **The Idea**
- **Results**
- **Main Task**
- **Methods**
- **Conclusion**

# The Idea

What music should I listen If I feel bad



# Results

<https://www.youtube.com/watch?v=54a0q762CI0>

# Main Task

How to Implement

- 1. BERT Text Analysis**
- 2. Music Database Integration**
- 3. Chat-to-Music Matching Algorithm**
- 4. Relevance Ranking and Personalization**
- 5. User Interface Design**

# **Dataset + Processing**

# Spotify Million Song Dataset

A dataset containing songs, artists names, link to song and lyrics



Data Card

Code (14)

Discussion (2)

## About Dataset

This is Spotify Million Song Dataset. This dataset contains song names, artists names, link to the song and lyrics. This dataset can be used for recommending songs, classifying or clustering songs.

Usability ⓘ

10.00

License

[CC0: Public Domain](#)


Expected update frequency

Never

Tags

# Spotify Million Song Dataset





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 bhadresh-savani


**bert-base-uncased-emotion** 


 like 18


 Text Classification


 Transformers


 PyTorch


 TensorFlow


 JAX


 Safetensors


 emotion


 English


 bert

 emotion


 Eval Results


 Inference Endpoints

 arxiv:1810.04805

 License: apache-2.0


[Model card](#) [Files and versions](#) [Community](#) **4**

 [Train](#) [Deploy](#) [Use in Transformers](#)

 Edit model card

**bert-base-uncased-emotion**

Model description:


 Safetensors ⓘ

Model size 109M params


Tensor type I64 · F32

Downloads last month

20,232






# bert-base-uncased-emotion

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 **cardiffnlp/twitter-roberta-base-sentiment**   like 228

Text Classification Transformers PyTorch TensorFlow JAX tweet\_eval English roberta Inference Endpoints arxiv:2010.12421

Model card Files and versions Community 11


Train Deploy Use in Transformers


Edit model card


### Twitter-roBERTa-base for Sentiment Analysis

This is a roBERTa-base model trained on ~58M tweets and finetuned for sentiment analysis with the TweetEval benchmark. This model is suitable for English (for a similar multilingual model, see [XLM-T](#)).

Downloads last month  
2,106,109



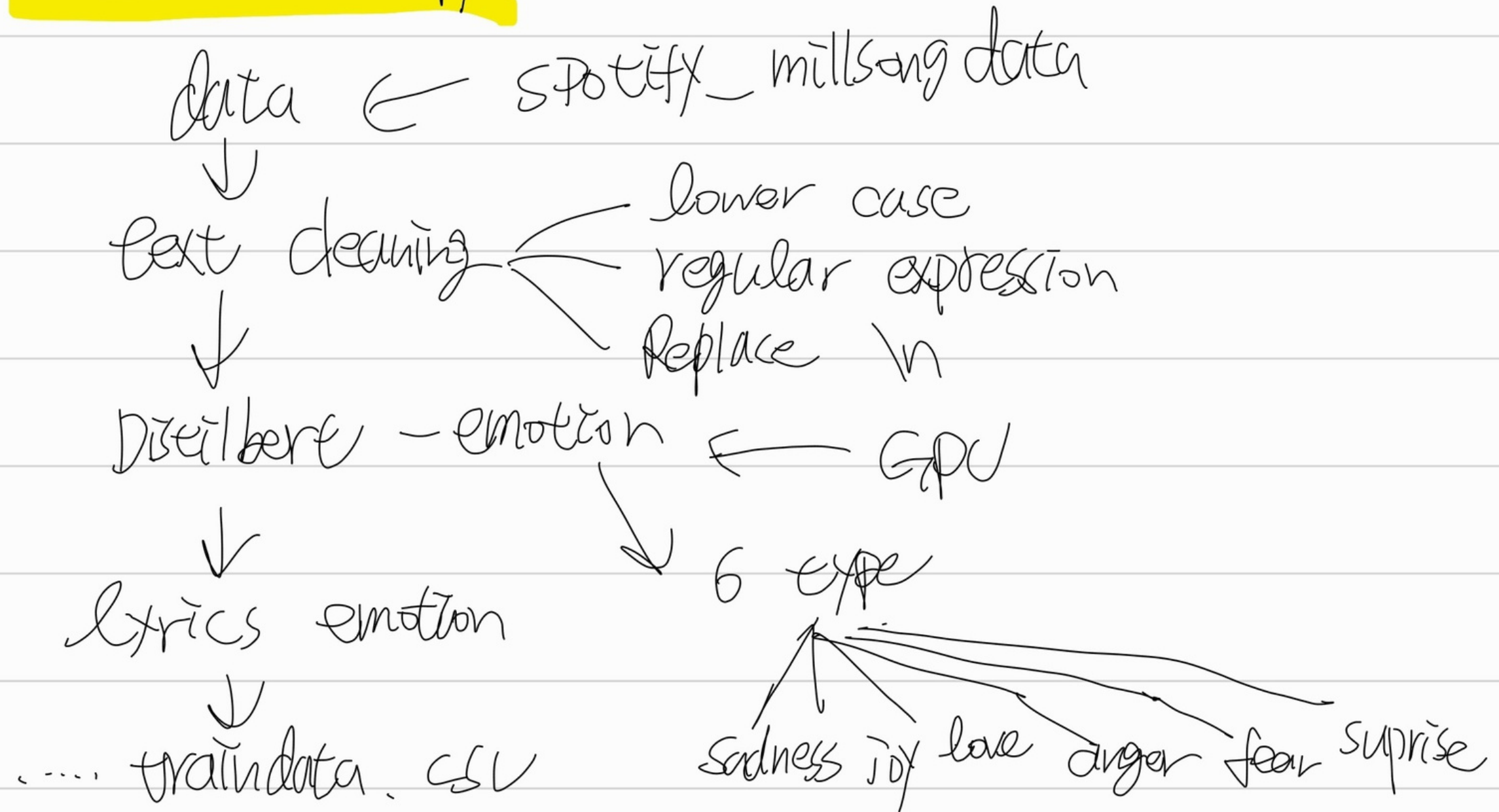
 **Inference API** ⓘ

 Text Classification [Examples](#) ▼

# twitter-roberta-base-sentiment

# **Music Database Mood Integration**

## music mood . ipynb



	artist	song	text	sadness	joy	love	anger	fear	surprise
0	ABBA	Ahe's My Kind Of Girl	look at her face, it's a wonderful face \r an...	0.000284	0.998917	0.000303	0.000132	0.000167	0.000196
1	ABBA	Andante, Andante	take it easy with me, please \r touch me gent...	0.002162	0.102594	0.891564	0.000729	0.002013	0.000938
2	ABBA	As Good As New	i'll never know why i had to go \r why i had ...	0.804719	0.171543	0.002526	0.017968	0.001365	0.001879
3	ABBA	Bang	making somebody happy is a question of give an...	0.00288	0.019789	0.972059	0.004212	0.000504	0.000556
4	ABBA	Bang-A-Boomerang	making somebody happy is a question of give an...	0.02931	0.077233	0.838309	0.052503	0.001412	0.001232
...	...	...	...	...	...	...	...	...	...
57645	Ziggy Marley	Good Old Days	irie days come on play \r let the angels fly ...	0.000865	0.997525	0.000827	0.000437	0.000178	0.000168
57646	Ziggy Marley	Hand To Mouth	power to the workers \r more power \r power ...	0.005675	0.003453	0.0006	0.988928	0.00097	0.000374
57647	Zwan	Come With Me	all you need \r is something i'll believe \r...	0.372944	0.036884	0.00204	0.546501	0.040127	0.001503
57648	Zwan	Desire	northern star \r am i frightened \r where ca...	0.050649	0.001487	0.000561	0.00382	0.942673	0.00081
57649	Zwan	Heartsong	come in \r make yourself at home \r i'm a bi...	0.000595	0.000666	0.000796	0.99664	0.001076	0.000228
57650 rows × 9 columns									

# Music Database Clustering

music - kmeans - ipynb

traineddata.csv



Scaling the data



kmeans ← 4 cluster



clustered data

Happy  
Anxious / sad  
Energetic  
Clam

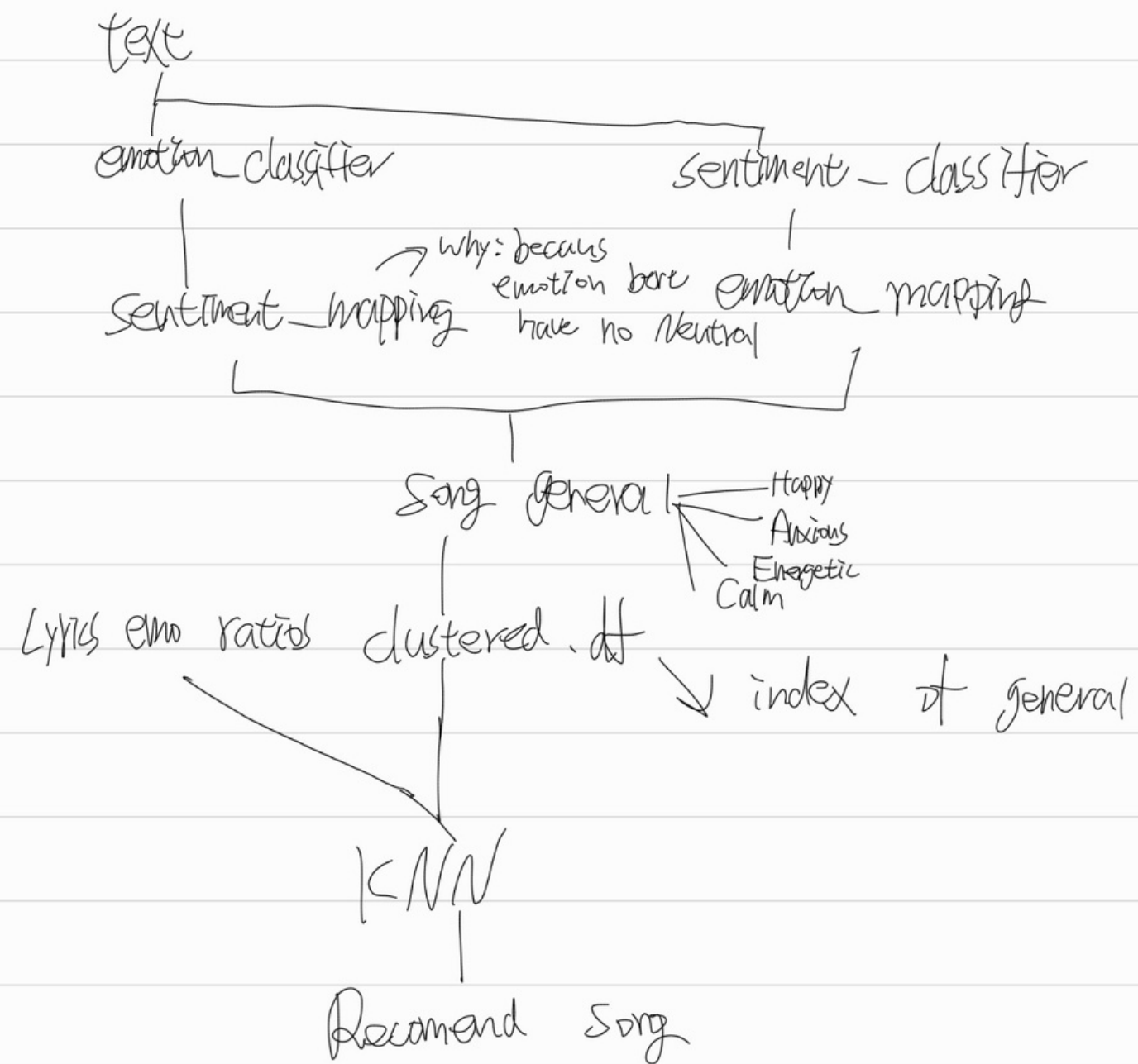


	sadness	joy	love	anger	fear	surprise	Cluster	Cluster Name
0	0.000284	0.998917	0.000303	0.000132	0.000167	0.000196	0	Happy
1	0.002162	0.102594	0.891564	0.000729	0.002013	0.000938	0	Happy
2	0.804719	0.171543	0.002526	0.017968	0.001365	0.001879	1	Anxious/Sad
3	0.002880	0.019789	0.972059	0.004212	0.000504	0.000556	0	Happy
4	0.029310	0.077233	0.838309	0.052503	0.001412	0.001232	0	Happy



# Chat-to-Music Matching Algorithm

## music - search - ipynb



The mapped song category is: Happy

```
song_list
knn_data = song_list.drop(columns=['Cluster', 'Cluster Name'])
knn_data
```

	sadness	joy	love	anger	fear	surprise
0	0.000284	0.998917	0.000303	0.000132	0.000167	0.000196
1	0.002162	0.102594	0.891564	0.000729	0.002013	0.000938
3	0.002880	0.019789	0.972059	0.004212	0.000504	0.000556
4	0.029310	0.077233	0.838309	0.052503	0.001412	0.001232
11	0.000533	0.997985	0.000700	0.000445	0.000202	0.000135
...	...	...	...	...	...	...
57625	0.004884	0.952083	0.002239	0.037981	0.001817	0.000997
57632	0.001208	0.989216	0.001292	0.007178	0.000750	0.000356
57638	0.005849	0.983987	0.001684	0.007313	0.000802	0.000365
57641	0.004559	0.963978	0.001969	0.027313	0.001425	0.000756
57645	0.000865	0.997525	0.000827	0.000437	0.000178	0.000168

25891 rows × 6 columns

```
[ ]
array([0.97132064, 0.92075195, 0.93364823, 0.94880388, 0.0850701 ,
       0.22479665])
```

```
from sklearn.neighbors import NearestNeighbors

# Reshape the generated emotion ratios for compatibility with NearestNeighbors
query_point = random_emotion_ratios.reshape(1, -1)

# Using NearestNeighbors to find the closest point
nn = NearestNeighbors(n_neighbors=10)
nn.fit(knn_data)
distance, index = nn.kneighbors(query_point)

# Retrieve the closest emotion ratio from the dataset
closest_emotion_ratio = knn_data.iloc[index[0]]

closest_emotion_ratio, distance[0]
```

```
C:\Users\yeapo\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCa
warnings.warn(
(
  sadness    joy    love    anger    fear    surprise
10670  0.297166  0.215347  0.265114  0.212264  0.008144  0.001965
49013  0.339184  0.236248  0.178180  0.239755  0.004645  0.001987
48583  0.310853  0.190750  0.187313  0.300772  0.008200  0.002112
32995  0.352378  0.247281  0.188399  0.204357  0.005482  0.002102
5948   0.176612  0.237094  0.293821  0.286322  0.003418  0.002734
11760  0.339477  0.207819  0.280213  0.163070  0.007928  0.001494
26088  0.275260  0.141072  0.242191  0.330471  0.008596  0.002409
52338  0.305945  0.202773  0.153145  0.327233  0.009492  0.001412
7091   0.203317  0.182020  0.357383  0.251667  0.003650  0.001964
56812  0.300726  0.178385  0.328973  0.181167  0.008574  0.002175,
array([1.4131814 , 1.41341321, 1.41477153, 1.41498302, 1.41534155,
       1.4169231 , 1.41709351, 1.41752134, 1.41771662, 1.4181384 ]))
```



	artist	song	link	text
10670	Kinks	End Of The Season	/k/kinks/end+of+the+season_20079121.html	Winter time is coming \r\nAll the sky is grey...
49013	Prince	And God Created Woman	/p/prince/and+god+created+woman_20111391.html	In a deep sleep I fell \r\nAnd the music star...
48583	Planetshakers	Never Stop	/p/planetshakers/never+stop_20729687.html	All my hopes \r\nAnd all my dreams \r\nGod I...
32995	Frankie Goes To Hollywood	Get It On	/f/frankie+goes+to+hollywood/get+it+on_2070552...	Well you're dirty and sweet, clad in black. \...
5948	Faith No More	Am I Evil?	/f/faith+no+more/am+i+evil_20583909.html	(Originally recorded by Diamond Head) \r\n \...
11760	Lionel Richie	Piece Of Love	/l/lionel+richie/piece+of+love_20083903.html	Time can heal a broken heart \r\nOh, but does...
26088	Bon Jovi	Amen	/b/bon+jovi/amen_21055380.html	Amen \r\nLast night I had a dream \r\nThe dr...
52338	Sting	Roxanne	/s/sting/roxanne_10225122.html	Roxanne, you don't have to put on the red ligh...
7091	Gordon Lightfoot	Heaven Don't Deserve Me	/g/gordon+lightfoot/heaven+dont+deserve+me_200...	I'm not afraid that when I'm dying \r\nThere'...
56812	Wyclef Jean	Sweetest Girl (Dollar Bill)	/w/wyclef+jean/sweetest+girl+dollar+bill_20954...	Ah ah ah ah \r\n \r\nSome live for the bill ...

# GUI

Make it look like Spotify

Web

Your Mood                      Emotion Ratio



music\_serch.px

serch\_dt

Album\_cover

show result

# BERT Music Recommender System

Put Your Mood

Enter your text

I love transformers

Lyrics Emotion Ratio Sliders



Recommend Songs

You might like songs from the 'Happy' genre.

Recommended Songs:

	artist	song	lyrics
25,112	Bette Midler	Do You Want To Dance	Do you wanna dance, and hold my hand? Tell me you're my lo
32,019	Eurythmics	Jennifer	Jennifer with your orange hair Jennifer with your green eyes
26,699	Bryan White	Two In A Million	In a world of illusion Filled with wrong turns Where so many
57,089	Yeah Yeah Yeahs	These Paths	These paths we'll cross again, again These pants rubbed off a
1,514	Black Sabbath	The Writ	The way I feel is the way I am I wish I'd walked before I started
36,968	Incubus	Have You Ever	To get up and walk away will be too easy So stay and stand yo
26,378	Bread	Don't Shut Me Out	Don't shut me out, shut me out, out of your life Don't shut the
2,047	Bruce Springsteen	Into The Fire	The sky was falling and streaked with blood I heard you callin
22,835	Ace Of Base	C'est La Vie	I am as young as I'm feeling I'm always 21, I am always 21 C'e
30,722	Eagles	Learn To Be Still	It's just another day in paradise As you stumble to your bed Y

Do You Want To I Jennifer

Two In A Million These Paths

The Writ



# Conclusion

The thing that need to be improve



**Q&A**

## References

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- Sentiment Analysis with Python: [Hugging Face Blog](#)
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  - Content-Based Filtering - [YouTube Video](#)
  - User-Related Recommendations - [YouTube Video](#)
  - Content-Related Recommendations - [YouTube Video](#), [Spotify Million Song Dataset on Kaggle](#)
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  - Chat Data Set for Emotion Detection - [Hugging Face Dataset](#)
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