

Assignment No 4: Sentiment Analysis

Summary	Analyze the tone for a given piece of music by using Musixmatch API and IBM Watson Tone Analyzer
URL	
Category	Web
Environment	NA
Status	Version 1
Feedback Link	
Team No	7
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Introduction

K3G Music enterprises is planning to launch a new music station which would enable listeners to listen to music based on how they feel. They plan to use Machine learning to classify songs. Acknowledging there are new songs added to their catalog on a daily basis, they intend to build a machine learning based classifier service which would classify songs as (Happy/Sad).

Goal & Approach

Goal

Our goal for this project is to create a web application which could analyze tone for top K list of songs in UK, Canada and Australia. To determine this functionality we design a web page that consists of a dropdown for these 3 countries and for choosing the number of songs (top K) for that country. The web page displays the tone and lyrics for each song on receiving correct inputs from the user.

Approach:

Using Flask

We have used Flask for creating a frontend for our website on localhost by embedding HTML and CSS file for assembling the input elements such as country, no of songs (top-k songs). On providing these inputs the application could fetch top k songs in the respective country along with lyrics and tone for each song. We have used JavaScript for supporting validation to input.

Musixmatch API

We used Musixmatch lyrics API for fetching country-specific ranked songs and their lyrics. Musixmatch API is a service which allows you to retrieve lyrics by using its API methods and Input parameters. The data is retrieved from the API request and response for each API call. We created API requests by using the base URL <https://api.musixmatch.com/ws/1.1/> and API method **chart.tracks.get** to get top K list for the desired country(input parameter = country code) and **track.lyrics.get** to retrieve lyrics for all the tracks(input parameter = track id) by appending it with an API key. Every request in return delivered a JSON response and status codes if the status code is 200 the request is successful. The JSON response consists of data such as track id, track name, track artist, lyrics_body, lyrics_language, lyrics_copyright, etc. We only focus on pulling the track names and track lyrics from these responses for tone analysis.

Tone Analyzer

Our main objective for this website to show the emotion of the selected song and for getting tone and emotion of the song. We used the tone analyzer model for analyzing tone for the songs. We obtained tone by using Tone analyzer API from an IBM Watson and using this URL, <https://tone-analyzer-demo.ng.bluemix.net/>. We created an account on IBM Cloud and created an API key for getting authorization for API and used the key in our code. We got the emotion and tone for a list of songs which we fetched from Musixmatch. Tone analyzer API will make an API call and by performing sensitive analysis of lyrics it will identify a tone and will provide tone. As per our requirement, we are only showing either Happy or Sad tone based on score value, whichever is higher.

Create a Heroku Account on the below link

<https://www.heroku.com/>

Once the account is created, follow the below steps. Make sure you have a git clone copy in your local machine or you can directly

connect GitHub from Heroku account

heroku login

This will ask you to enter email id and password

heroku create app_name

This will create an application in Heroku which you can see on Heroku Dashboard
git add.

Add all the files

git commit -m "App ready to deploy"

Commit the code

git push heroku master

This will push the entire app on Heroku Server

heroku config:set PORT=5000

This will set the Port

heroku ps:scale web=1

This is to ensure that at least one instance of an app is running

heroku open

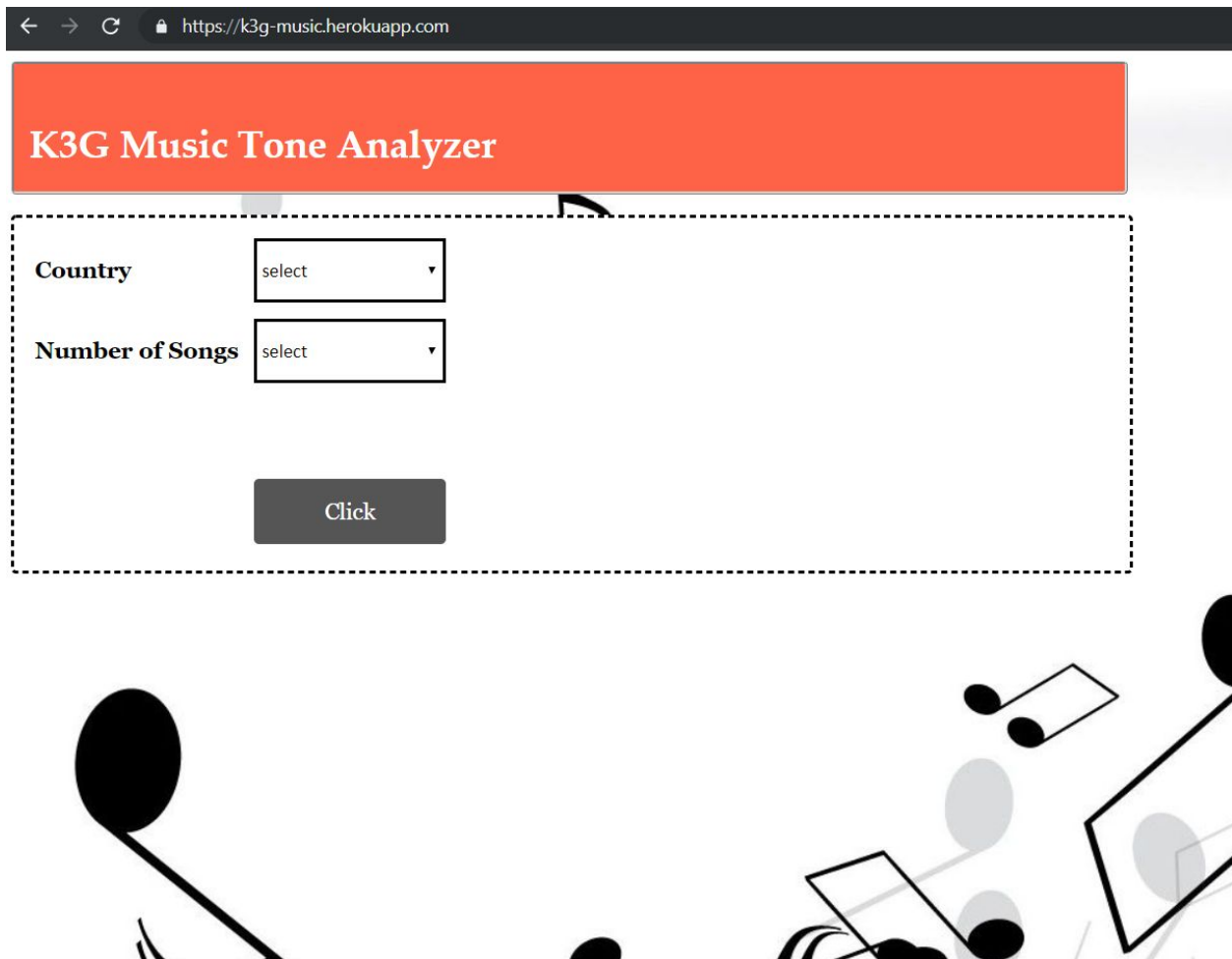
Visit the app through generated URL or with the above command

heroku logs

This is to check the logs if anything goes wrong.

How to use website?

Step 1 - User will directly go to <https://k3g-music.herokuapp.com/> and get the home page of the website.



The screenshot shows a web browser window with the address bar displaying <https://k3g-music.herokuapp.com/>. The main heading is "K3G Music Tone Analyzer" in white text on an orange background. Below the heading, there is a dashed-line box containing two dropdown menus. The first dropdown is labeled "Country" and has "select" as the current option. The second dropdown is labeled "Number of Songs" and also has "select" as the current option. Below these dropdowns is a dark gray button labeled "Click". The background of the website features abstract black and white geometric shapes and musical notes.

Step 2 - Select country(UK, Canada, and Australia) from the dropdown. Also a select number of songs from the dropdown.If the user requires any other number can provide in the text box. And hit the click button.

K3G Music Tone Analyzer

Country

UK ▼

Number of Songs

5 ▼

Click

K3G Music Tone Analyzer

Country

Canada ▼

Number of Songs

Other ▼

4 ▼

Click

If the user is not selecting any input from the given dropdown then it will provide an alert box to the user.

K3G Music Tone Analyzer

k3g-music.herokuapp.com says
Please select a Country

OK

Country

select

Number of Songs

select

Click

Step 3 - After submitting country and no of songs and it will take to next page, where selected no. of songs will come in the dropdown. Now this page will give user two options, the user can go back to home page or can select any song and click on submit button.

K3G Music Tone Analyzer

Top Songs for the day!!!

Songs List

select

select

Someone You Loved

Piece Of Your Heart

Just You and I

Giant

So Am I

Home

If the user is not selecting any option from the dropdown then will get an error for selecting an option.

K3G Music Tone Analyzer

k3g-music.herokuapp.com says

Please select a Song

OK

Top Songs for the day!!!

Songs List

select ▼

Home

Submit

Step 4 - After clicking on submit button, it will reload the same page and provide lyrics and tone (Happy/Sad) of the song.

K3G Music Tone Analyzer

Top Songs for the day!!!

Just You and I

Lyrics :

Let's get drunk I'll pour my heart out through my mouth This year's been hard for us no doubt Let's raise a glass to a better one Let all the things that we've overcome And bring hope to us 'cause Me and you we can hold this out Only you understand how I'm feeling now Yeah And I know, I can tell you anything You won't judge, You're just listening (Yeah) 'Cause you're the best thing that ever happened to me 'Cause my darling, you and I could take over the world And one step at a time, just you and I (Just you and I) 'Cause you're the only one, Who brings light just like the sun One step at a time, just you and I (Just you and I) ...

Songs List

Someone You Loved ▼

Tone : Joy



Home

Submit

A user can select another song from the list on the same page and can get lyrics and tone of the song or can go back to get another top list songs of some other country.

K3G Music Tone Analyzer

Top Songs for the day!!!

So Am I


Lyrics :

Do you ever feel like a misfit? Everything inside you is dark and twisted Oh, but it's okay to be different 'Cause baby, so am I (so am I, so am I, so am I-I-I-I-I) Can you hear the whispers all across the room? You feel her eyes all over you like cheap perfume You're beautiful, but misunderstood So why you tryna be just like the neighborhood? I can see it, I know what you're feelin' So let me tell you 'bout my little secret I'm a little crazy underneath this Underneath this Do you ever feel like a misfit? Everything inside you is dark and twisted Oh, but it's okay to be different 'Cause baby, so am I (So am I, so am I, so am I) Do you ever feel like an outcast? ...

Songs List

Someone You Loved ▾

Tone : Sadness



Home

Submit

Website link - <https://k3g-music.herokuapp.com/>

Youtube link - https://youtu.be/zwZd-_Amkmk

Metrics

A **confusion matrix** is a summary of prediction results on a classification problem.

The number of correct and incorrect predictions are summarized with count values and broken down by each class. It gives us insight not only into the errors being made by a classifier but more importantly the types of errors that are being made.

Below given confusion matrix is based on training and validation dataset, where we already had tone(mood) given for the songs based on their lyrics. As we ran our code for the same songs to

get the tone based on tone analyzer API. And we passed actual and predicted values as input and we received below confusion matrix.

Confusion matrix - Validation dataset

actual class	happy	431	120
	sad	493	156
		happy	sad
		predicted class	

Now, this matrix is having True Positive, False Positive, True Negative and False Negative value. Each value depicts how this model is confused when it makes predictions.

1. True Positive - Tone is happy and we predicted happy
2. False Positive - Tone is happy but we predicted sad
3. False Negative - Tone is sad but we predicted happy
4. True Negative - Tone is sad and we predicted sad

Factors	Values
Precision	0.7822141560798548
Recall	0.7030995106035889
F1 Score	0.7405498281786941
F1 %	74.0549828178694
Error Rate	0.5108333333333334
Accuracy	0.48916666666666664

Languages and Tools Used

Language	Python 3.7
Libraries/Tools	flask, watson_developer_cloud, requests, flask_wtf

Visualization	matplotlib
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Citations

<https://www.youtube.com/watch?v=WFRzKmpepj4>

https://github.com/rasbt/musicmood/blob/master/code/classify_lyrics/nb_init_model.ipynb

https://cloud.ibm.com/apidocs/tone-analyzer?cm_mc_uid=66082496868415533773271&cm_mc_sid_50200000=20674811553470131372&cm_mc_sid_52640000=90887421553470131374&code=python

<https://www.geeksforgeeks.org/confusion-matrix-machine-learning/>