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Spotify Music Features

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Import Package

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

import spotipy
import spotipy.util as util
```

pip install spotipy

Training

使用csv來訓練情緒的分類

df_feature_selected = df.drop(['f_name', 'a_name', 'title', 'lyrics', 'spot_id', 'sr_json', 'tr_json', "mood"], axis=1)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	f_name	a_name	title	lyrics	spot_id	sr_json	tempo	energy	danceability	loudness	valence	acousticness	r_json	mood
2	angry_all/50	PJ Harvey	50 Ft Queen	Hey I'm one	3fJprjhRxTV	{ "tracks": {	126.366	0.667	0.382	-16.077	0.718	0.000652	{	1
3	angry_all/A	Keane	A Bad Drea	Why do I ha	17ScnUBsr3	{ "tracks": {	145.035	0.76	0.405	-4.852	0.316	0.00824	{	1
4	angry_all/Ag	The Faint	Agenda Suic	You could fc	4Mhj9IjSxT	{ "tracks": {	144.585	0.703	0.574	-7.789	0.275	0.00658	{	1
5	angry_all/Al	Stiff Little F	Alternative U	There's nothi	0MDJjySh4y	{ "tracks": {	118.181	0.925	0.6	-9.148	0.382	0.00882	{	1
6	angry_all/Ar	The Cranber	Animal Insti	Suddenly soı	3J58Ccc5iTt	{ "tracks": {	132.145	0.823	0.622	-5.381	0.605	0.0946	{	1
7	angry_all/Bl	Living Sacrif	Bloodwork	A simple tes	4wmH0KK	{ "tracks": {	86.383	0.879	0.344	-5.111	0.479	0.000427	{	1
8	angry_all/Bc	Pixies	Bone Machi	(This is a sor	58BsYHaW	{ "tracks": {	115.906	0.678	0.63	-12.757	0.964	0.000677	{	1
9	angry_all/Bc	Ice Cube	Bop Gun	At these up	10oZiK5HCM	{ "tracks": {	103.05	0.837	0.891	-5.402	0.767	0.283	{	1
10	angry_all/Bc	Kaiser Chief	Boxing Chai	We went to t	1r7XNA9Cz	{ "tracks": {	119.674	0.553	0.494	-4.848	0.296	0.962	{	1
11	angry_all/Br	Recoil	Breath Conti	Who wouldr	4CSyaZkuA	{ "tracks": {	162.002	0.645	0.58	-9.784	0.546	0.0609	{	1
12	angry_all/Br	Evanescence	Bring Me To	How can yoı	0COqiPhxzc	{ "tracks": {	189.931	0.945	0.316	-3.169	0.32	0.00895	{	1
13	angry_all/Bu	Nine Inch N	Burn	This world r	0nCvBep0qe	{ "tracks": {	89.919	0.912	0.592	-6.81	0.647	0.00146	{	1
14	angry_all/Ca	Kelis	Caught Out	Yo, this song	1nZkrUFLq2	{ "tracks": {	92.996	0.691	0.848	-6.775	0.922	0.0512	{	1
15	angry_all/Ch	Ice Cube	Check Yo Se	So come on	3NGT0Td7F	{ "tracks": {	101.368	0.735	0.934	-6.668	0.768	0.031	{	1

Fit to random forests

```
clf = RandomForestClassifier( min_samples_split=4, criterion="entropy" )

features_train, features_test, labels_train, labels_test = train_test_split( features, labels, test_size=0.20, random_state=91)
```

```
Test Accuracy: 0.848314606741573
---------------------------------------------
Precision: 0.8506850837253214
Recall: 0.848314606741573
confusion matrix
[[63  9  3  4]
 [ 9 83  4  2]
 [ 4  1 69  4]
 [ 4  0 10 87]]
```

find the accuracy of the model

try other classifier
kNN、SVM、Decision Tree

Try other classifier

Random Forest Classifier ☆

```
RandomForest Train Accuracy: 0.9823943661971831
RandomForest Test Accuracy: 0.8202247191011236
--------------------------------------------------
RandomForest Precision: 0.8210756861425652
RandomForest Recall: 0.8202247191011236
RandomForest confusion matrix
[[70  9 11  1]
 [10 82  2  6]
 [ 3  5 61  8]
 [ 2  0  7 79]]
```

Support Vector Machines, SVM

```
SVM Train Accuracy: 0.676056338028169
SVM Test Accuracy: 0.5056179775280899
--------------------------------------------------
SVM Precision: 0.4998380210144346
SVM Recall: 0.5056179775280899
SVM confusion matrix
[[34 20 20 17]
 [22 48 16 14]
 [12 17 32 16]
 [ 9  2 11 66]]
```

Decision Tree Classifier

```
DecisionTree Train Accuracy: 0.9929577464788732
DecisionTree Test Accuracy: 0.797752808988764
--------------------------------------------------
DecisionTree Precision: 0.8009008060227272
DecisionTree Recall: 0.797752808988764
DecisionTree confusion matrix
[[69 10  8  4]
 [ 9 72  9 10]
 [ 2  5 61  9]
 [ 3  0  3 82]]
```

K Nearest Neighbor, kNN

```
kNN  Train Accuracy: 0.652112676056338
kNN  Test Accuracy: 0.5084269662921348
--------------------------------------------------
kNN Precision: 0.5111367785310117
kNN  Recall: 0.5084269662921348
kNN  confusion matrix
[[43 23 13 12]
 [29 48 12 11]
 [19 14 32 12]
 [15  4 11 58]]
```

Try other classifier

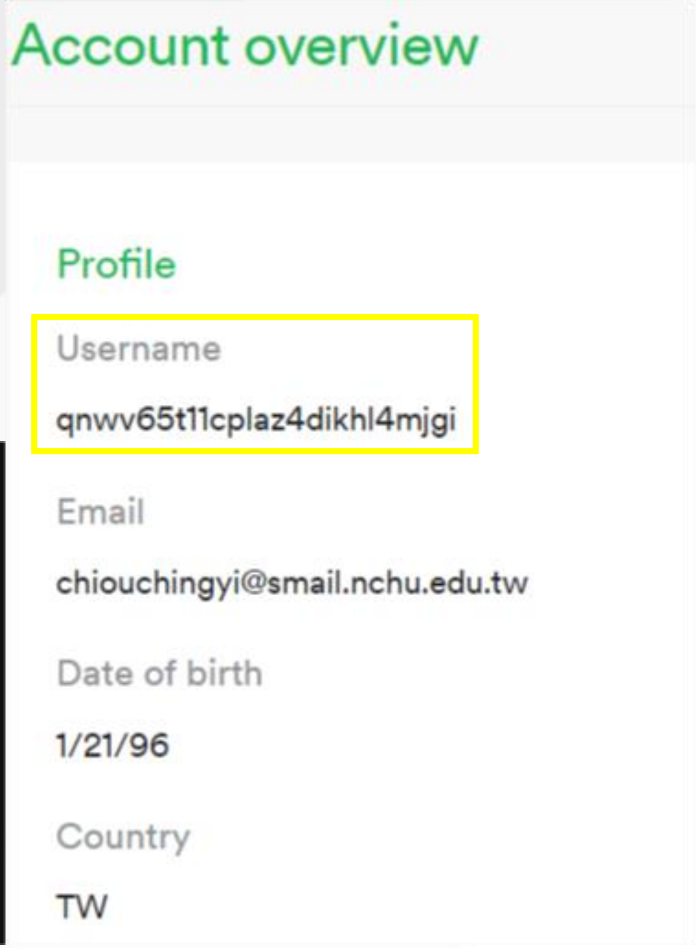
AdaBoost Classifier

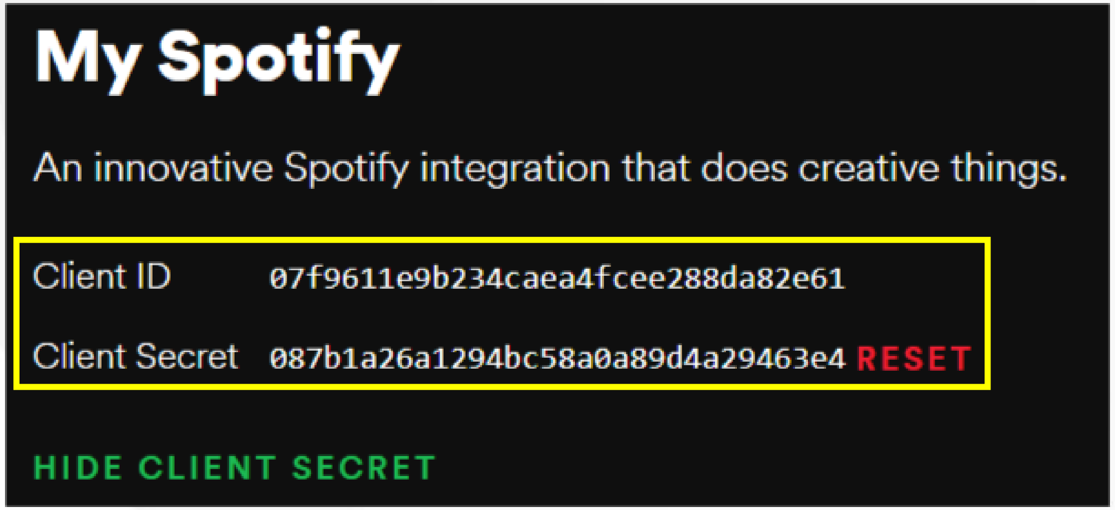
```
AdaBoost  Train Accuracy: 0.5091549295774648
AdaBoost  Test Accuracy: 0.46629213483146065
--------------------------------------------
AdaBoost Precision: 0.4817275400870143
AdaBoost  Recall: 0.46629213483146065
AdaBoost  confusion matrix
[[38 15 18 20]
 [17 55 10 18]
 [ 7  7 37 26]
 [10 12 30 36]]
```

Predict New Music

code for spotify get meta

```
username = 'qnwv65t11cplaz4dikhl4mjgi’
CLIENT_ID = '07f9611e9b234caea4fcee288da82e61'
CLIENT_SECRET = '087b1a26a1294bc58a0a89d4a29463e4'
REDIRECT_URI = 'http://localhost/'
SCOPE = 'user-library-read'
```





Predict New Music

Spotify Features

```
[{'danceability': 0.674,          # 跳舞性 (tempo, rhythm stability, beat strength, and overall regularity)
  'energy': 0.881,                # 強度
  'key': 9,                       # 調性 (0 = C、1 = C♯/D♭、 2 = D ...，沒偵測到=-1)
  'loudness': -2.853,             # 音軌的總響度(dB)
  'mode': 1,                      # 模式 (0=小調minor、1=大調major)
  'speechiness': 0.147,           # 音軌中存在的口語單詞
  'acousticness': 0.296,          # acoustic (0-1之間)
  'instrumentalness': 3.01e-06,   # 預測音軌包含人聲的程度
  'liveness': 0.0793,             # 檢測錄製中是否有觀眾 (值越高代表是live)
  'valence': 0.234,               # 音樂正向性 (值越高情緒越正面)
  'tempo': 98.994,                # bpm (每秒幾拍)
  'type': 'audio_features',
  'id': '5WHTFyqSii0lmT9R21abT8',   # 音樂ID
  'uri': 'spotify:track:5WHTFyqSii0lmT9R21abT8',   # 音樂uri
  'track_href': 'https://api.spotify.com/v1/tracks/5WHTFyqSii0lmT9R21abT8',
  'analysis_url': 'https://api.spotify.com/v1/audio-analysis/5WHTFyqSii0lmT9R21abT8',
  'duration_ms': 178480,          # 音軌時間長度(毫秒)
  'time_signature': 4}]           # 拍號 (每一小節有多少拍)
```

Predict New Music

singerdata.txt - 記...

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

Camila Cabello
Lika Morgan
Maroon 5
Dean Lewis
Ed Sheeran
DJ Khaled
Clean Bandit
Logic
Kendrick Lamar
Mark Morrison
Keala Settle
Selena Gomez
Celine Dion

Windc 第 13 100%

songdata.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

Havana
Give in To Me
Sugar
Be Alright
Shape of You
I'm the One
Symphony
1-800-273-8255
DNA.
Return Of The Mack - C & J Street Mix
This Is Me
Wolves
When I Fall In Love

Window 第 13 列 100%

Predict New Music

Table = [['Song Name', 'Singer', 'tempo', 'energy', 'loudness', 'danceability', 'valence', 'acousticness', 'happy', 'angry', 'sad', 'relax', 'Mood Class']]

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Havana	Camila Ca	104.988	0.523	-4.333	0.765	0.394	0.184	12	51.33333	36.66667	0	1
2	Give in To	Lika Morg	124.071	0.871	-4.069	0.769	0.672	0.0873	45	10	35	10	0
3	Sugar	Maroon 5	120.076	0.788	-7.055	0.748	0.884	0.0591	20	16	34	30	2
4	Be Alright	Dean Lew	126.684	0.586	-6.319	0.553	0.443	0.697	23.33333	22.66667	22.5	31.5	3
5	Shape of Y	Ed Sheera	95.977	0.652	-3.183	0.825	0.931	0.581	20	40	30	10	1
6	"Im the O	DJ Khaled	80.924	0.668	-4.284	0.609	0.811	0.0552	5.714286	26	58.28571	10	2
7	Symphony	Clean Ban	122.863	0.629	-4.581	0.707	0.457	0.259	5.714286	40	34.28571	20	1
8	1-800-273	Logic	100.021	0.574	-7.788	0.62	0.352	0.57	15	41.66667	20	23.33333	1
9	DNA.	Kendrick L	139.913	0.523	-6.664	0.638	0.422	0.00454	6	14	60	20	2
10	Return Of	Mark Mor	95.487	0.833	-5.379	0.715	0.612	0.00631	25.71429	6	38.28571	30	2
11	This Is Me	Keala Sett	191.702	0.704	-7.276	0.284	0.1	0.00583	10	6	64	20	2
12	Wolves	Selena Go	124.946	0.807	-4.59	0.72	0.305	0.129	15.71429	10	44.28571	30	2
13	When I Fa	Celine Dio	68.353	0.241	-13.251	0.19	0.107	0.577	56.66667	0	43.33333	0	0

Song Name
Singer

6 features

percent of 4 emotion

emotion
result

Problems

yourOutputTest.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Havana	Camila Ca	104.988	0.523	-4.333	0.765	0.394	0.184	12	51.33333	36.66667	0	1
2	Give in Tc	Lika Morg	124.071	0.871	-4.069	0.769	0.672	0.0873	45	10	35	10	0
3	Sugar	Maroon 5	120.076	0.788	-7.055	0.748	0.884	0.0591	20	16	34	30	2
4	Be Alright	Dean Lew	126.684	0.586	-6.319	0.553	0.443	0.697	23.33333	22.66667	22.5	31.5	3
5	Shape of Y	Ed Sheeran	95.977	0.652	-3.183	0.825	0.931	0.581	20	40	30	10	1
6	"Im the O	DJ Khaled	80.924	0.668	-4.284	0.609	0.811	0.0552	5.714286	26	58.28571	10	2
7	Symphony	Clean Ban	122.863	0.629	-4.581	0.707	0.457	0.259	5.714286	40	34.28571	20	1
8	1-800-273	Logic	100.021	0.574	-7.788	0.62	0.352	0.57	15	41.66667	20	23.33333	1
9	DNA.	Kendrick L	139.913	0.523	-6.664	0.638	0.422	0.00454	6	14	60	20	2
10	Return Of	Mark Mor	95.487	0.833	-5.379	0.715	0.612	0.00631	25.71429	6	38.28571	30	2
11	This Is Me	Keala Sett	191.702	0.704	-7.276	0.284	0.1	0.00583	10	6	64	20	2
12	Wolves	Selena Go	124.946	0.807	-4.59	0.72	0.305	0.129	15.71429	10	44.28571	30	2
13	When I Fa	Celine Dic	68.353	0.241	-13.251	0.19	0.107	0.577	56.66667	0	43.33333	0	0

yourOutputTest2.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Havana	Camila Ca	104.988	0.523	-4.333	0.765	0.394	0.184	35	40	2.5	22.5	1
2	Give in Tc	Lika Morg	124.071	0.871	-4.069	0.769	0.672	0.0873	25	45	12.5	17.5	1
3	Sugar	Maroon 5	120.076	0.788	-7.055	0.748	0.884	0.0591	23.33333	20	26.66667	30	3
4	Be Alright	Dean Lew	126.684	0.586	-6.319	0.553	0.443	0.697	56	4	20	20	0
5	Shape of Y	Ed Sheeran	95.977	0.652	-3.183	0.825	0.931	0.581	30.83333	26.66667	32.5	10	2
6	"Im the O	DJ Khaled	80.924	0.668	-4.284	0.609	0.811	0.0552	20	68	12	0	1
7	Symphony	Clean Ban	122.863	0.629	-4.581	0.707	0.457	0.259	25	50	25	0	1
8	1-800-273	Logic	100.021	0.574	-7.788	0.62	0.352	0.57	49.33333	14	33.33333	3.333333	0
9	DNA.	Kendrick L	139.913	0.523	-6.664	0.638	0.422	0.00454	15	33	32	20	1
10	Return Of	Mark Mor	95.487	0.833	-5.379	0.715	0.612	0.00631	33.33333	20	36.66667	10	2
11	This Is Me	Keala Sett	191.702	0.704	-7.276	0.284	0.1	0.00583	30	0	50	20	2
12	Wolves	Selena Go	124.946	0.807	-4.59	0.72	0.305	0.129	40	50	10	0	1
13	When I Fa	Celine Dic	68.353	0.241	-13.251	0.19	0.107	0.577	15	0	55	30	2

解決：np.random.seed(1)
每一次跑出來都一樣

Music Dataset

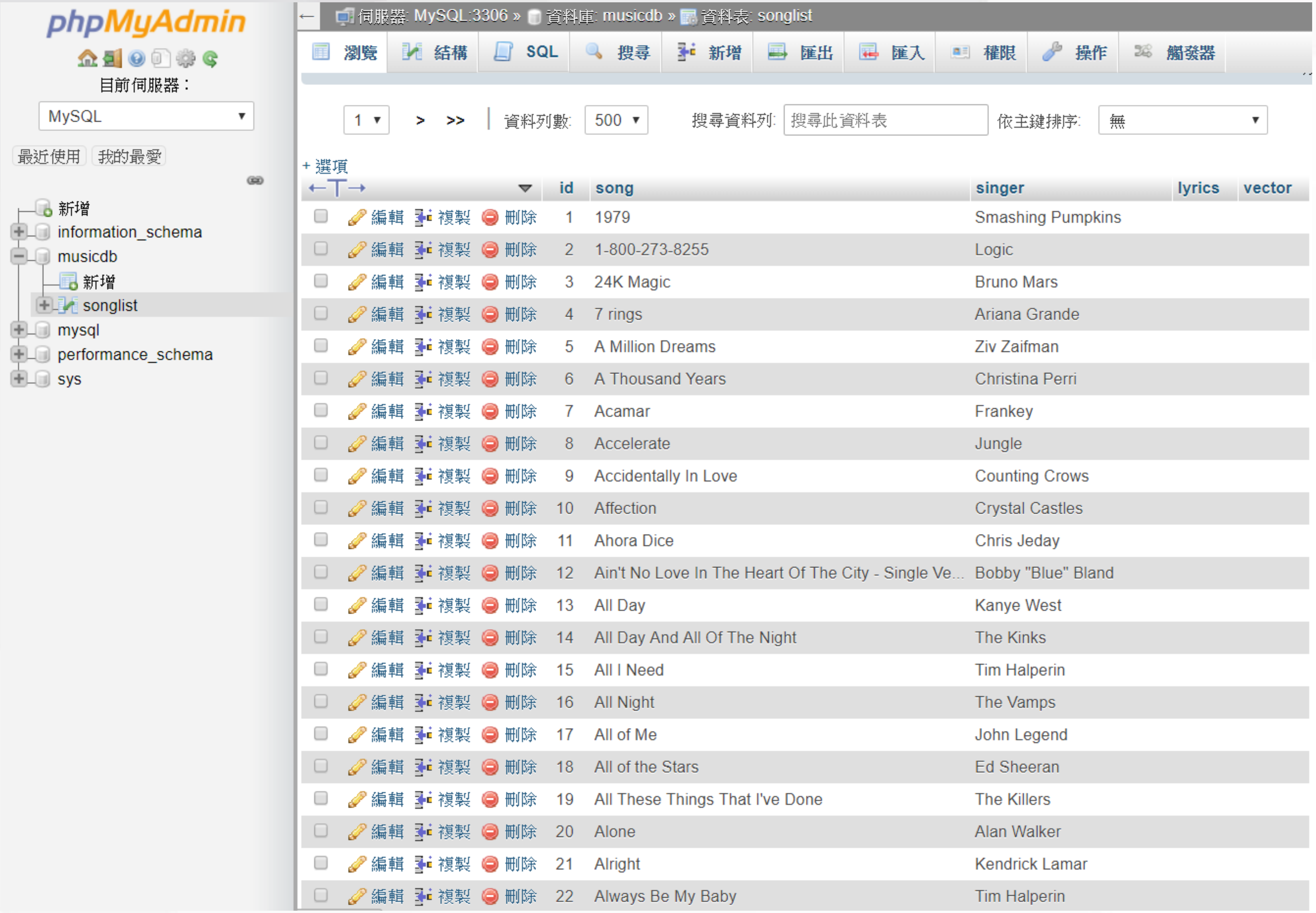
Happy : 117

Angry : 134

Sad : 177

Relax : 122

Total : 550



	id	song	singer	lyrics	vector
編輯 複製 刪除	1	1979	Smashing Pumpkins		
編輯 複製 刪除	2	1-800-273-8255	Logic		
編輯 複製 刪除	3	24K Magic	Bruno Mars		
編輯 複製 刪除	4	7 rings	Ariana Grande		
編輯 複製 刪除	5	A Million Dreams	Ziv Zaifman		
編輯 複製 刪除	6	A Thousand Years	Christina Perri		
編輯 複製 刪除	7	Acamar	Frankey		
編輯 複製 刪除	8	Accelerate	Jungle		
編輯 複製 刪除	9	Accidentally In Love	Counting Crows		
編輯 複製 刪除	10	Affection	Crystal Castles		
編輯 複製 刪除	11	Ahora Dice	Chris Jeday		
編輯 複製 刪除	12	Ain't No Love In The Heart Of The City - Single Ve...	Bobby "Blue" Bland		
編輯 複製 刪除	13	All Day	Kanye West		
編輯 複製 刪除	14	All Day And All Of The Night	The Kinks		
編輯 複製 刪除	15	All I Need	Tim Halperin		
編輯 複製 刪除	16	All Night	The Vamps		
編輯 複製 刪除	17	All of Me	John Legend		
編輯 複製 刪除	18	All of the Stars	Ed Sheeran		
編輯 複製 刪除	19	All These Things That I've Done	The Killers		
編輯 複製 刪除	20	Alone	Alan Walker		
編輯 複製 刪除	21	Alright	Kendrick Lamar		
編輯 複製 刪除	22	Always Be My Baby	Tim Halperin		

yourOutput_0316.csv

Music Dataset

編輯	複製	刪除	1	1979	Smashing Pumpkins
編輯	複製	刪除	2	1-800-273-8255	Logic
編輯	複製	刪除	3	24K Magic	Bruno Mars
編輯	複製	刪除	4	7 rings	Ariana Grande
編輯	複製	刪除	5	A Million Dreams	Ziv Zaifman
編輯	複製	刪除	6	A Thousand Years	Christina Perri
編輯	複製	刪除	7	Acamar	Frankey
編輯	複製	刪除	8	Accelerate	Jungle
編輯	複製	刪除	9	Accidentally In Love	Counting Crows
編輯	複製	刪除	10	Affection	Crystal Castles
編輯	複製	刪除	11	Ahora Dice	Chris Jeday
編輯	複製	刪除	12	Ain't No Love In The Heart Of The City	Bobby "Blue" Bland
編輯	複製	刪除	13	All Day	Kanye West
編輯	複製	刪除	14	All Day And All Of The Night	The Kinks
編輯	複製	刪除	15	All I Need	Tim Halperin
編輯	複製	刪除	16	All Night	The Vamps
編輯	複製	刪除	17	All of Me	John Legend
編輯	複製	刪除	18	All of the Stars	Ed Sheeran
編輯	複製	刪除	19	All These Things That I've Done	The Killers
編輯	複製	刪除	20	Alone	Alan Walker
編輯	複製	刪除	21	Alright	Kendrick Lamar
編輯	複製	刪除	22	Always Be My Baby	Tim Halperin
編輯	複製	刪除	23	Always Remember Us This Way	Lady Gaga
編輯	複製	刪除	24	Amazing	Westlife
編輯	複製	刪除	25	Amsterdam	Coldplay

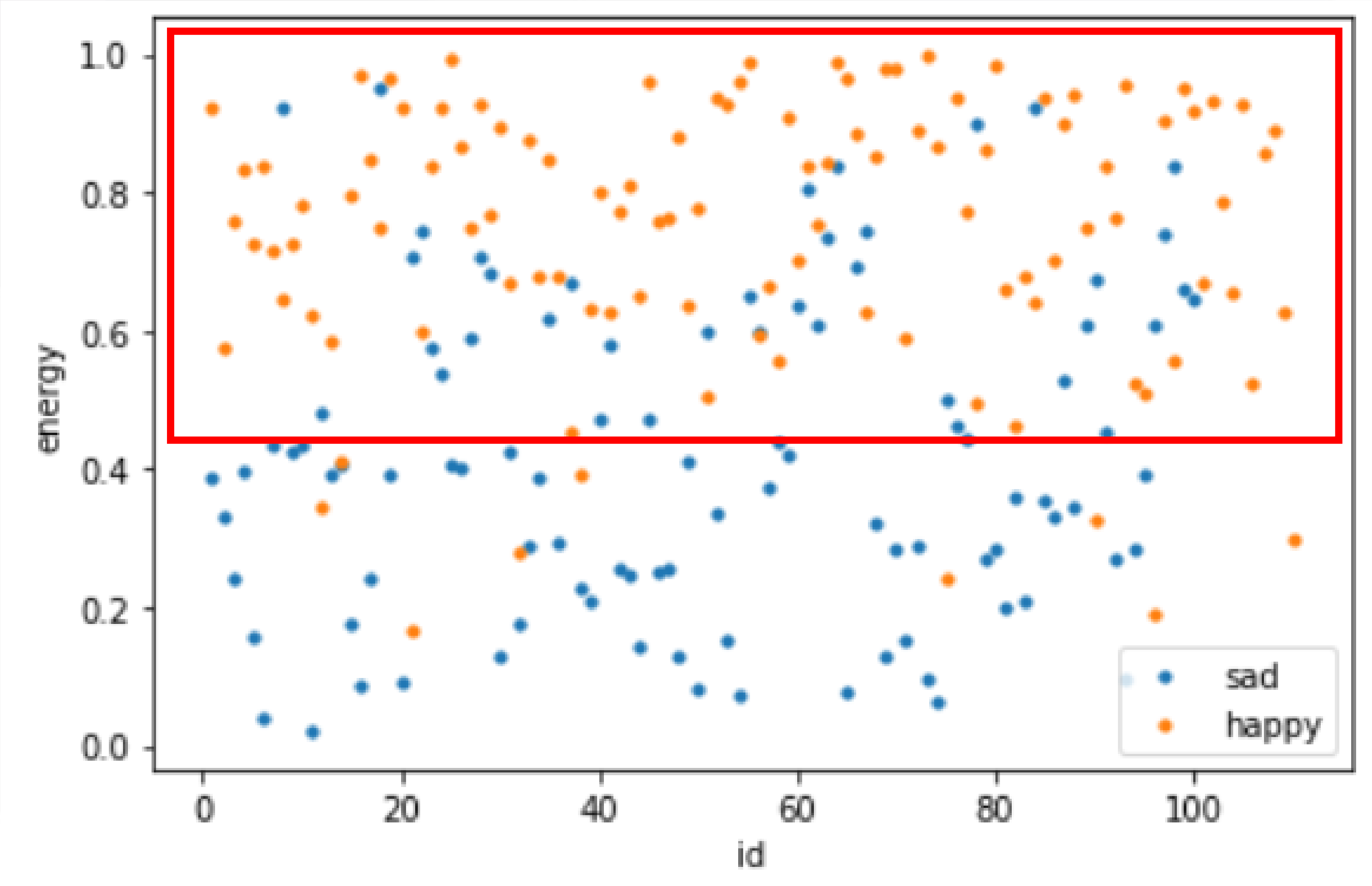
songdata7_0408.txt

singerdata7_0408.txt

移除歌名有feat等等

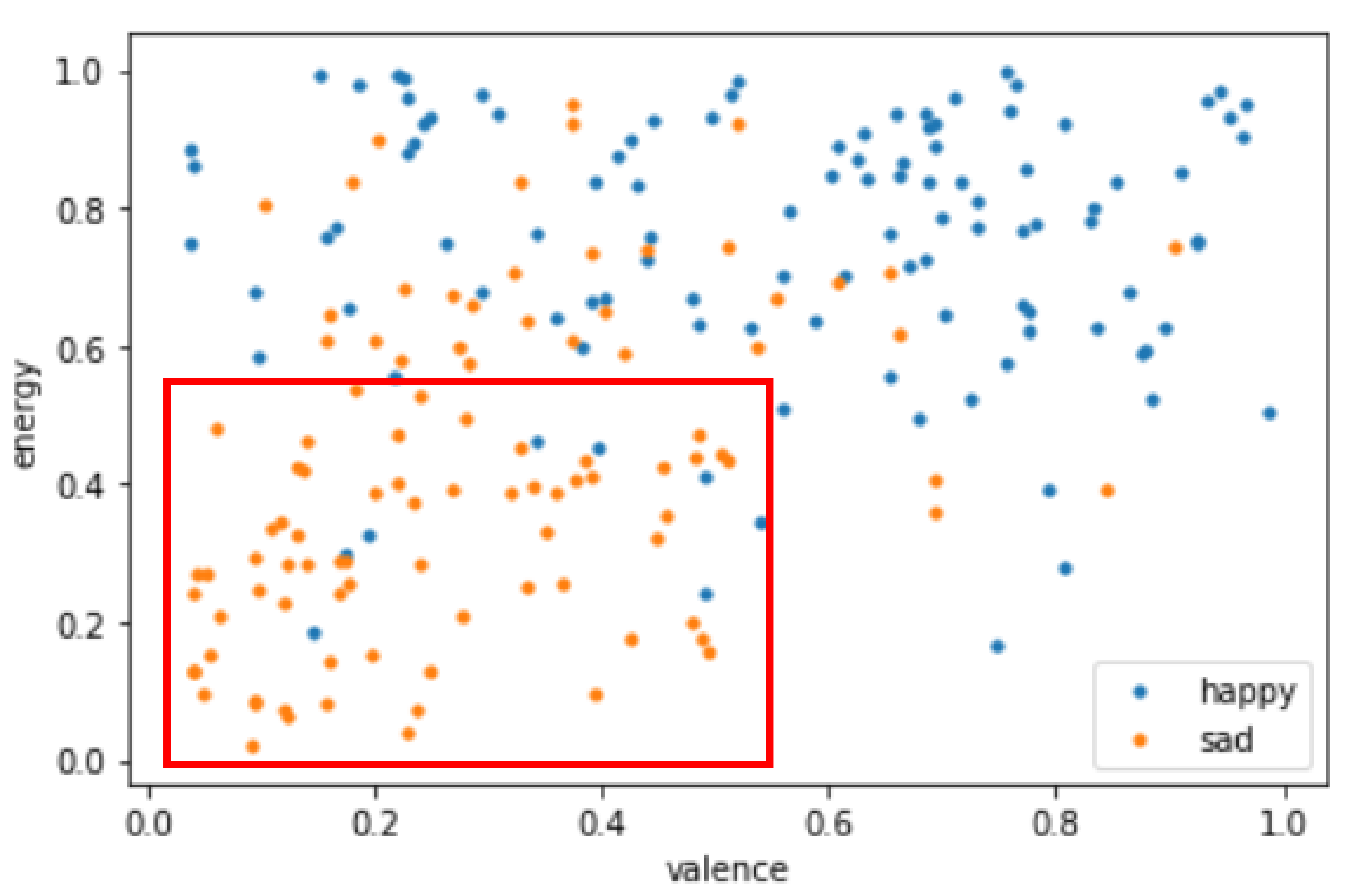
yourOutput_0408.csv

Features Analyze



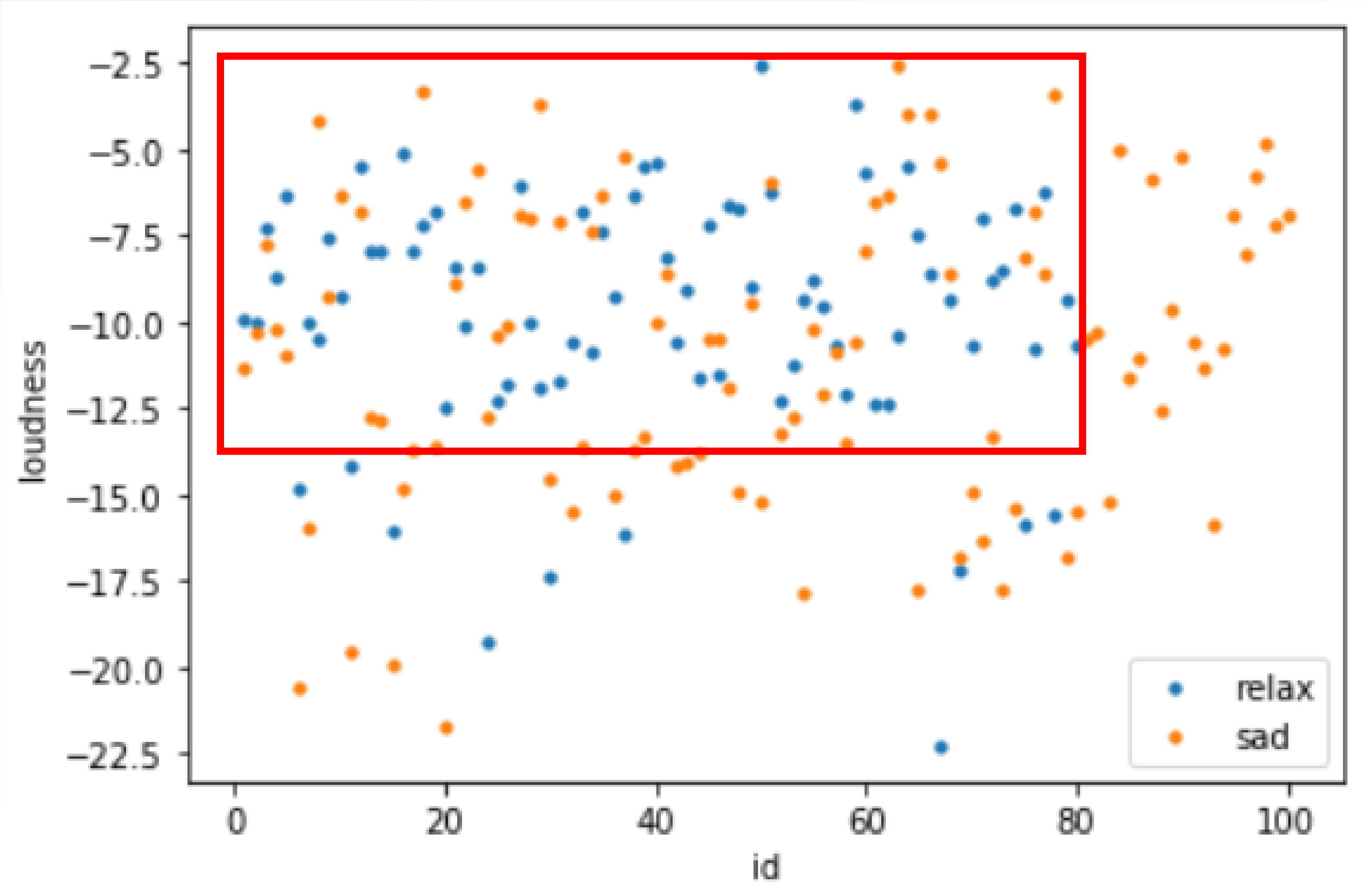
happy → energy高 / ~~sad → energy低~~

Features Analyze



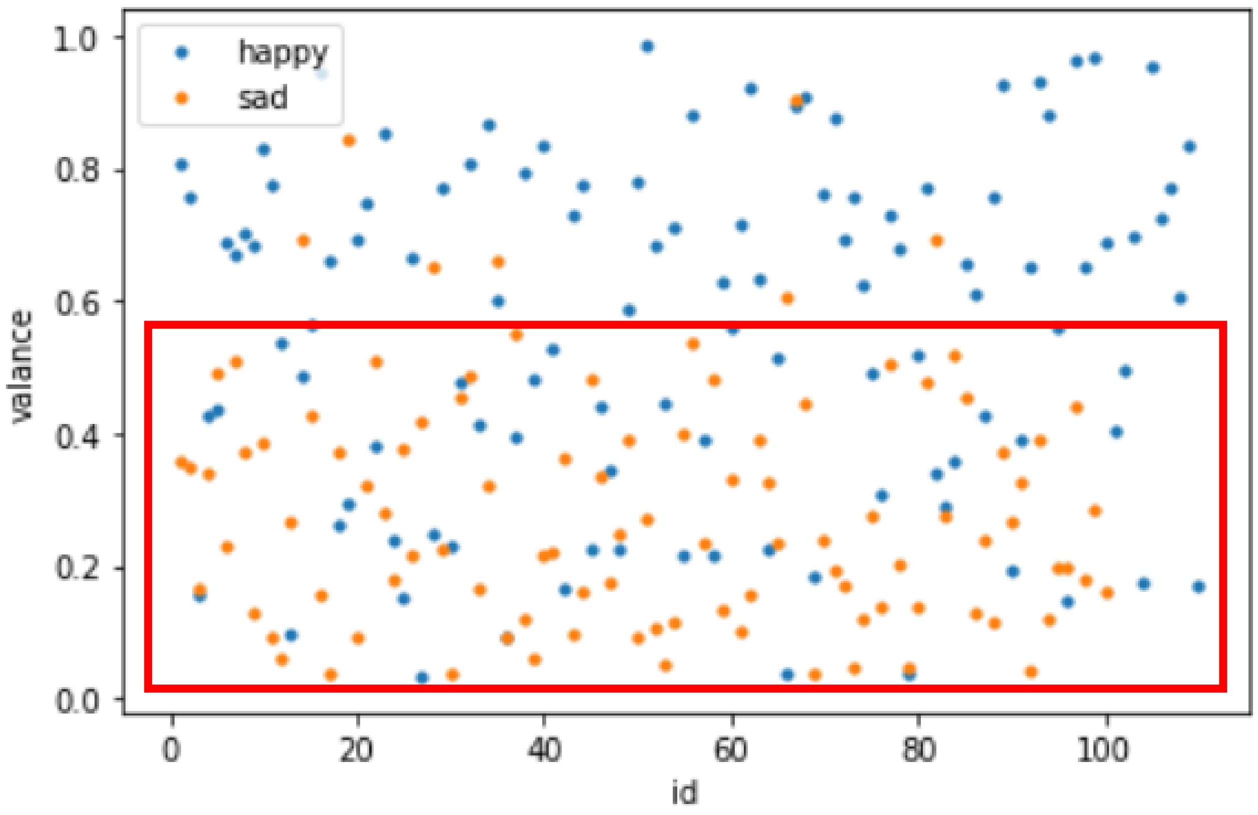
sad → valence低、energy低

Features Analyze

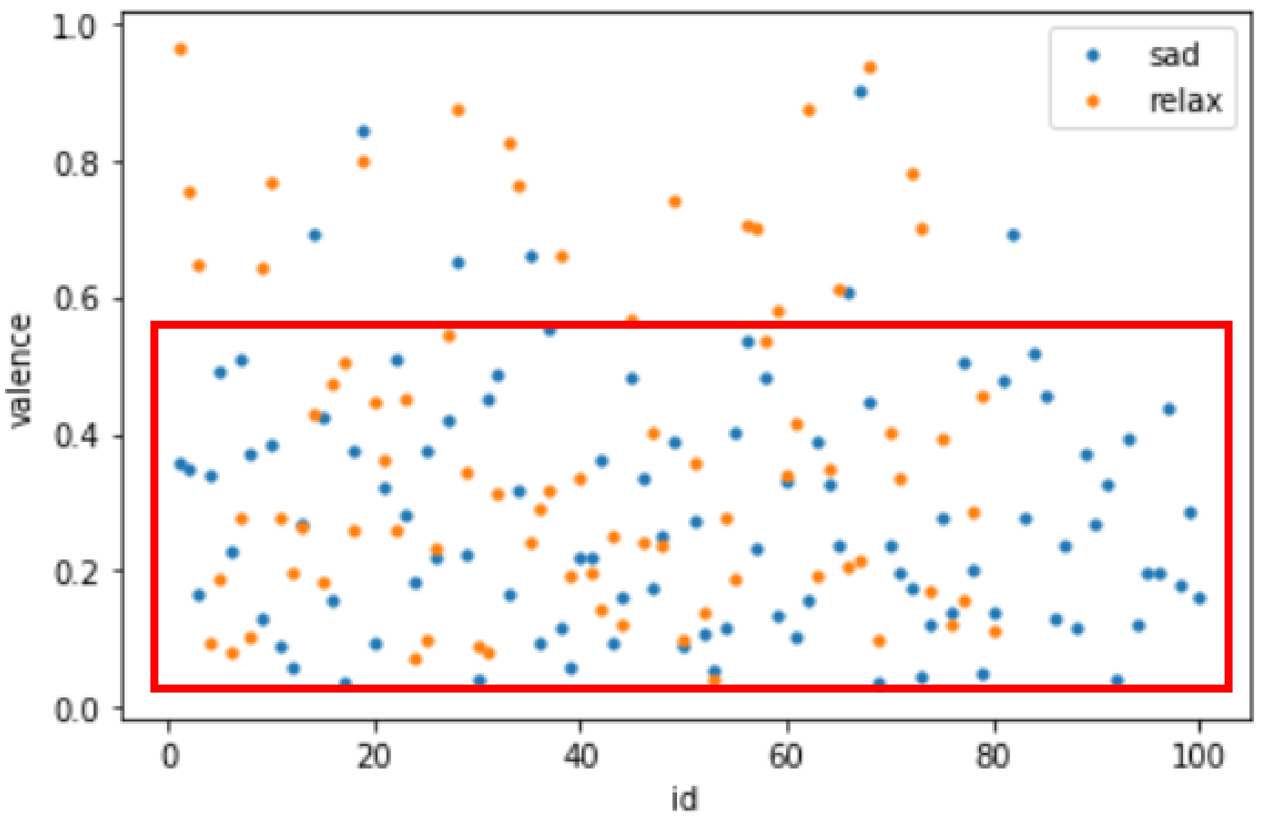


relax → loudness大

Features Analyze

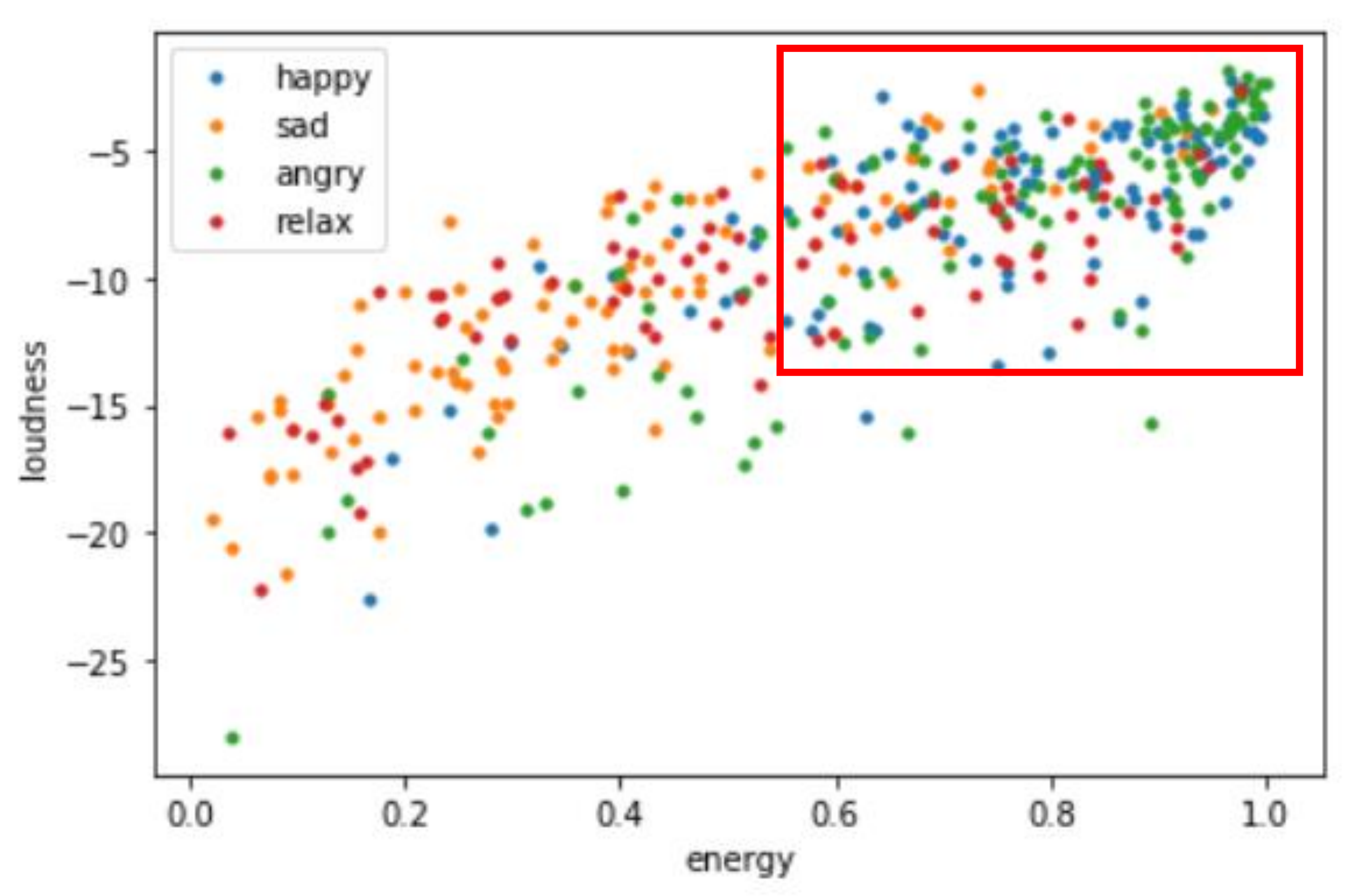


sad → valence低



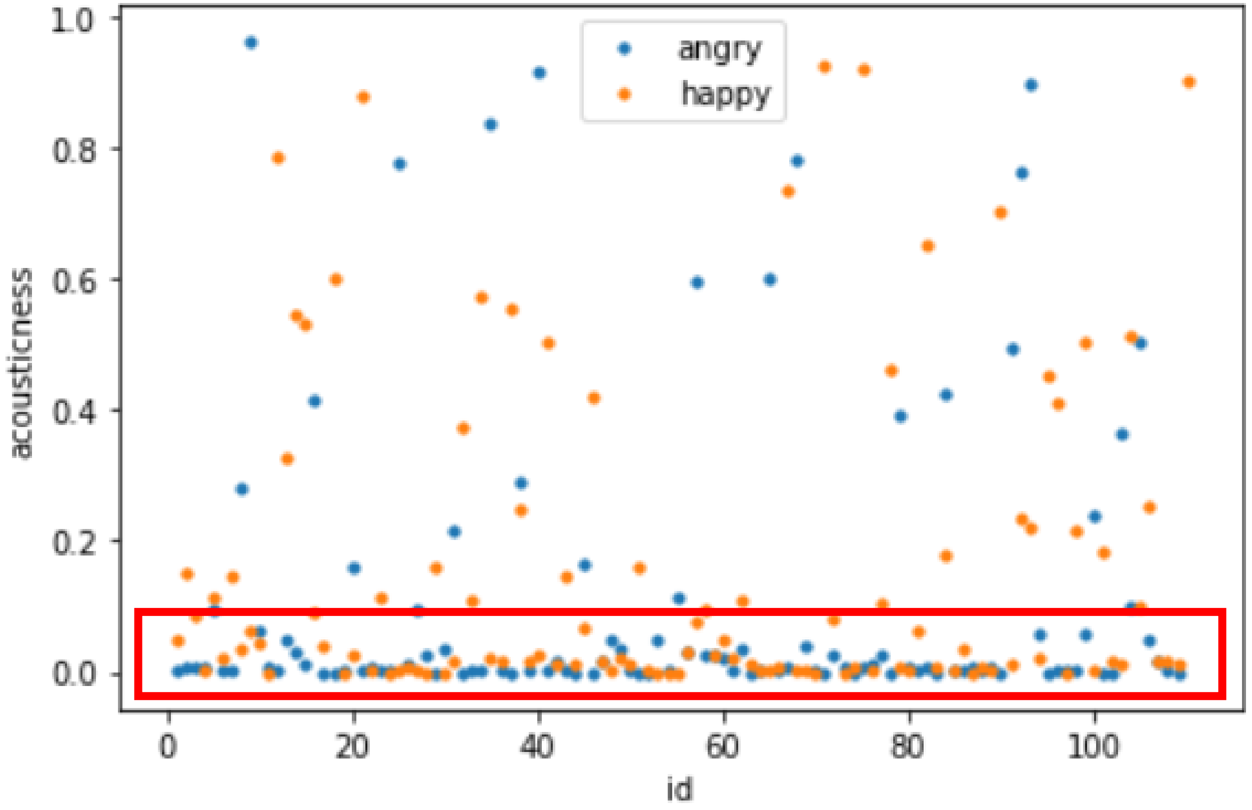
sad、relax → valence低

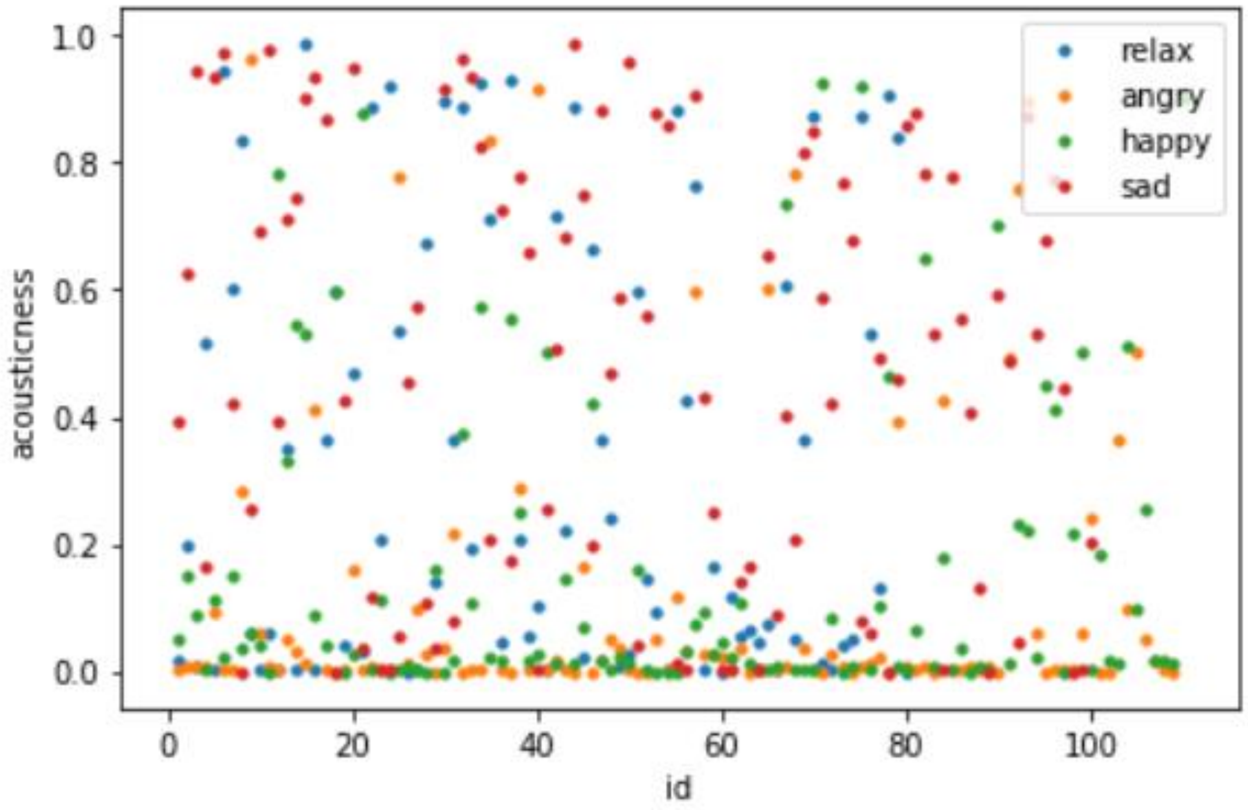
Features Analyze



happy、angry → energy高、loudness大

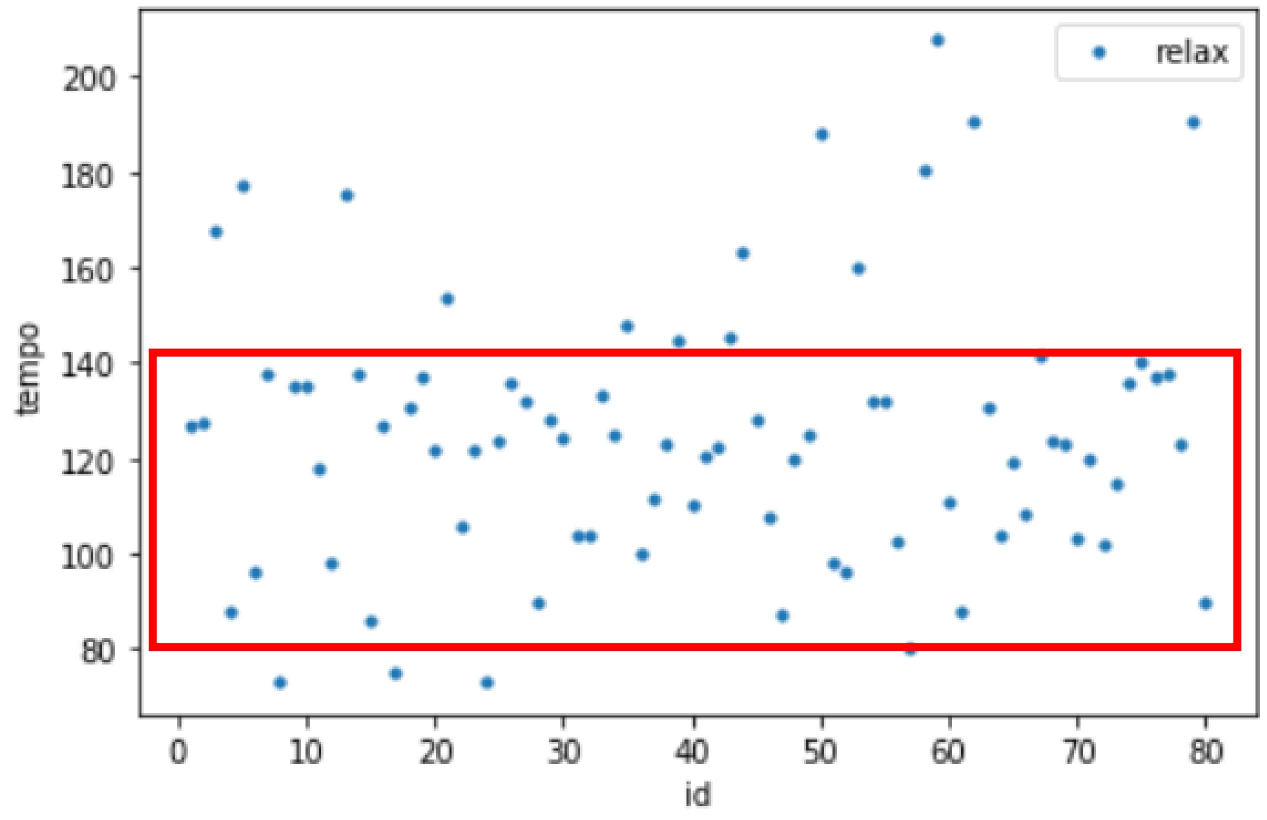
Features Analyze



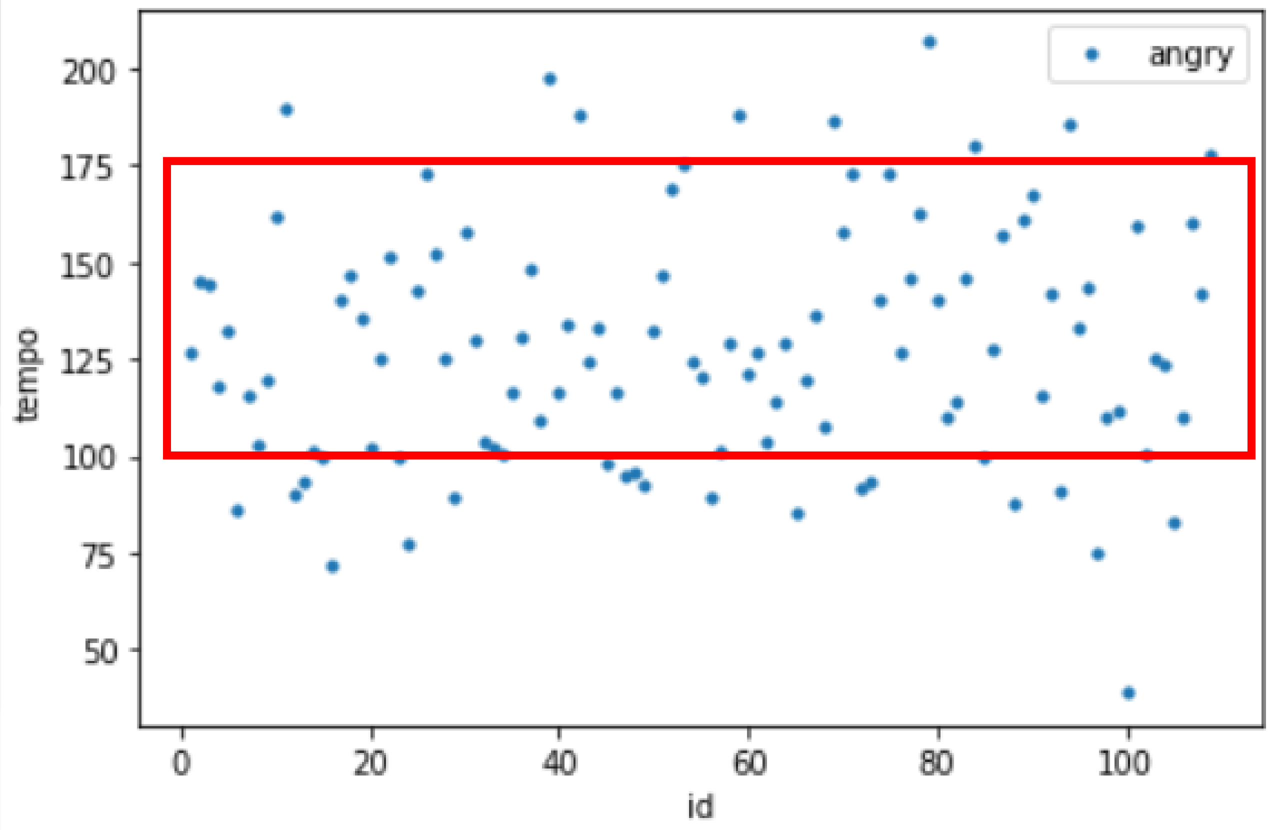


angry、happy → acousticness低

Features Analyze



relax → tempo(80-140)



angry → tempo(100-175)

Features Analyze

sad → valence低、~~energy低~~

angry、happy 區分？

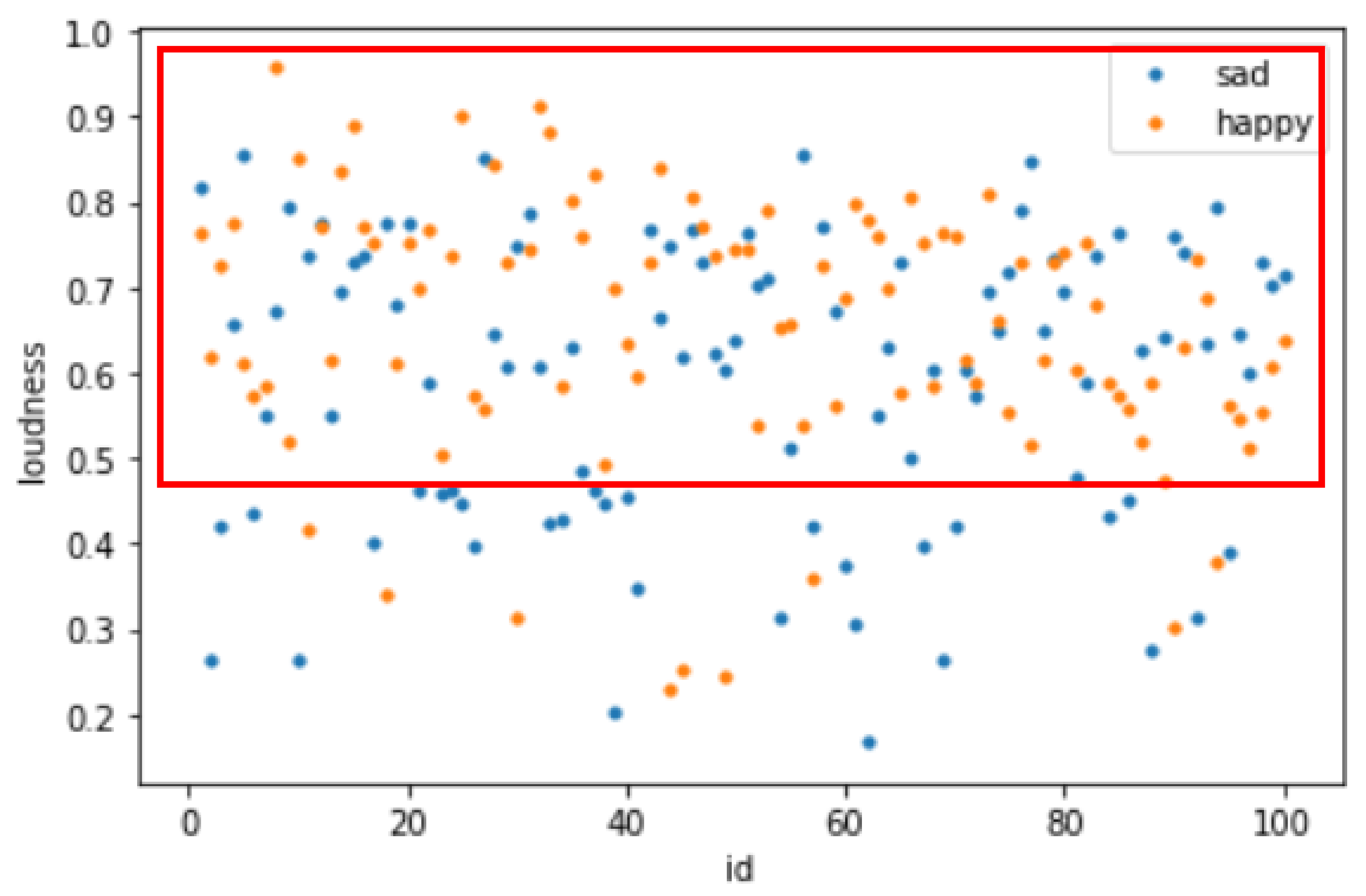
relax → loudness大、tempo(80-140)

happy、angry → energy高、loudness大、 acousticness低

angry → tempo(100-175)

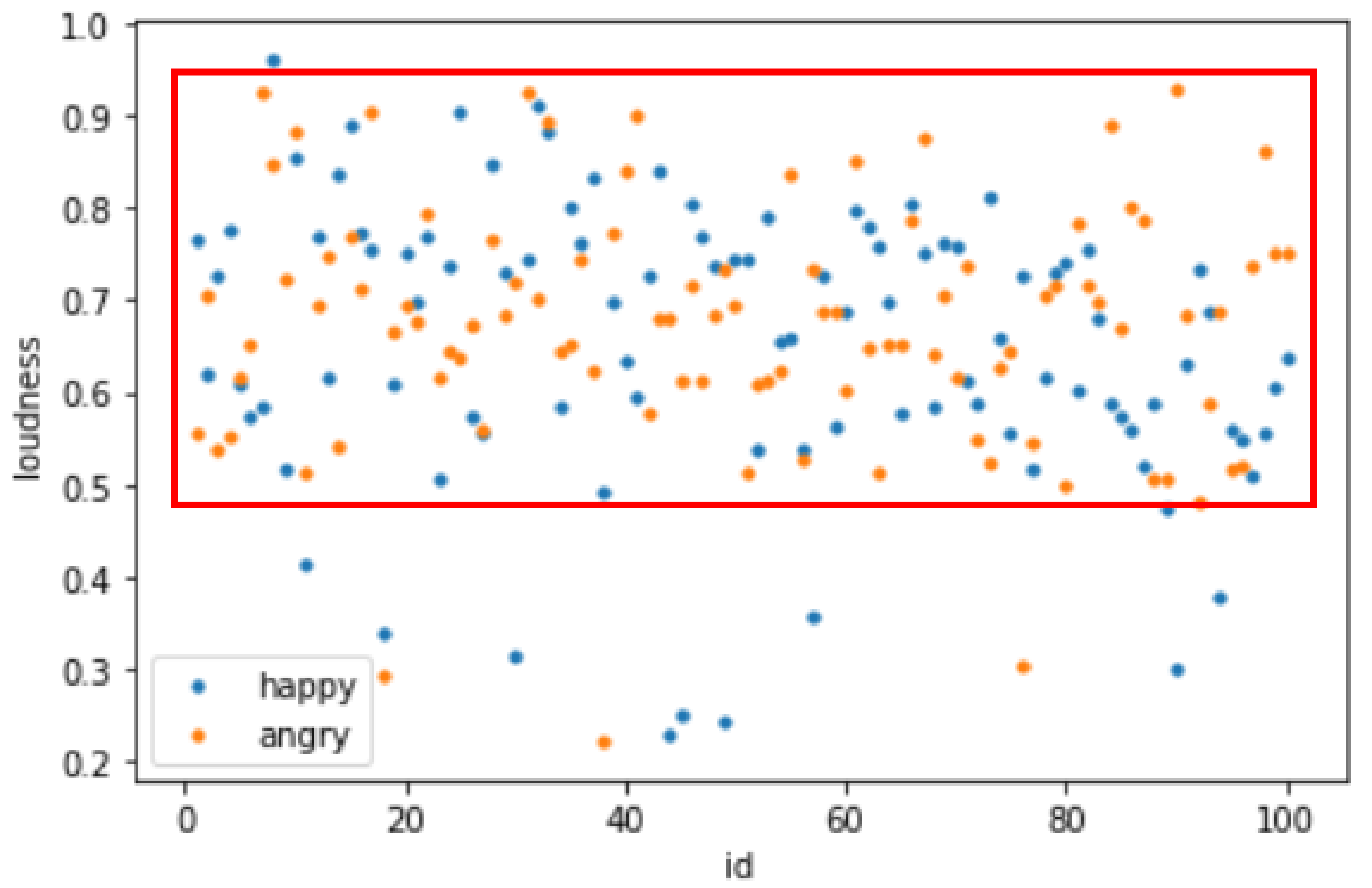
my dataset

Features Analyze



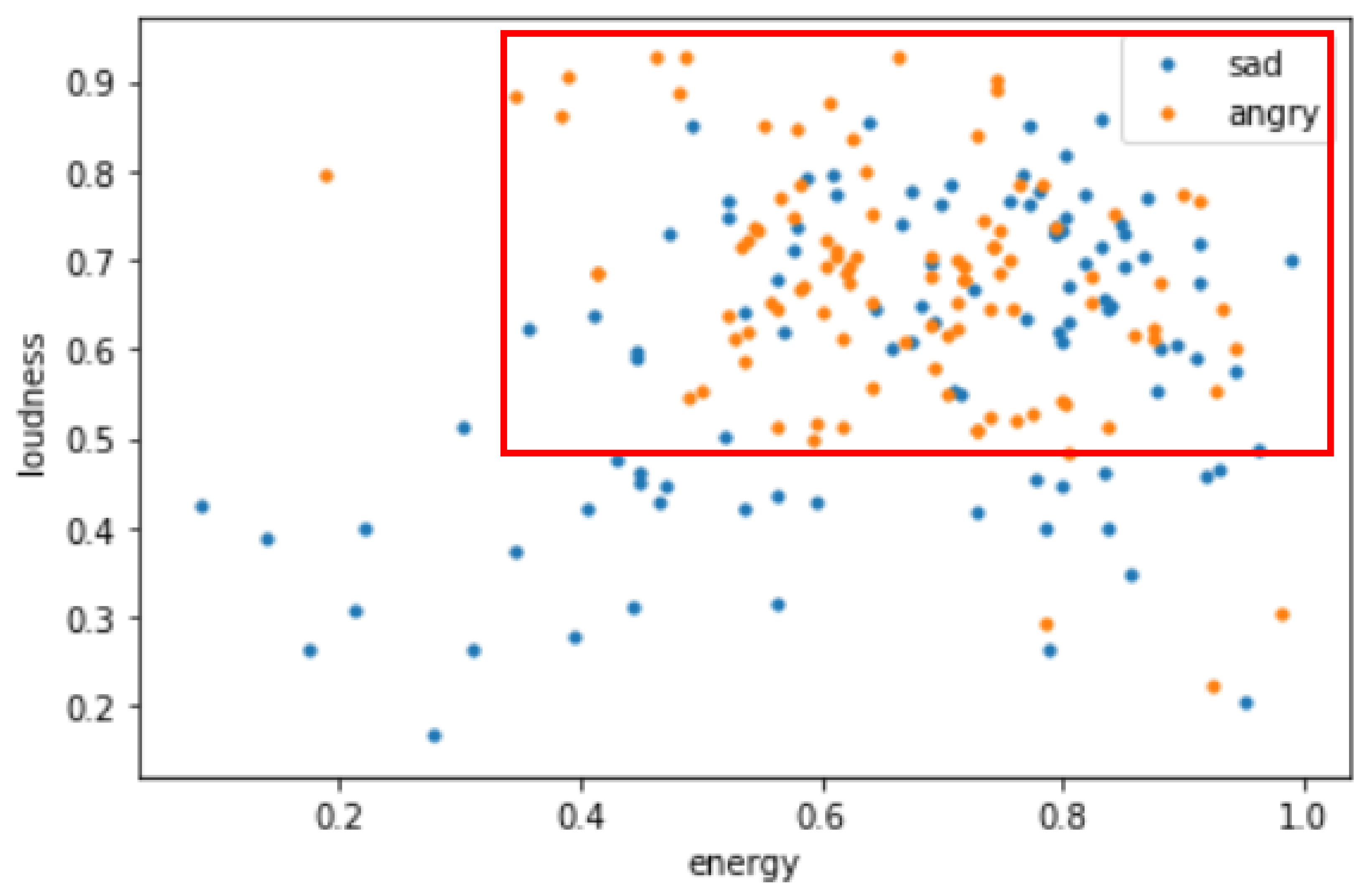
happy → loudness大

Features Analyze



happy、angry → loudness大

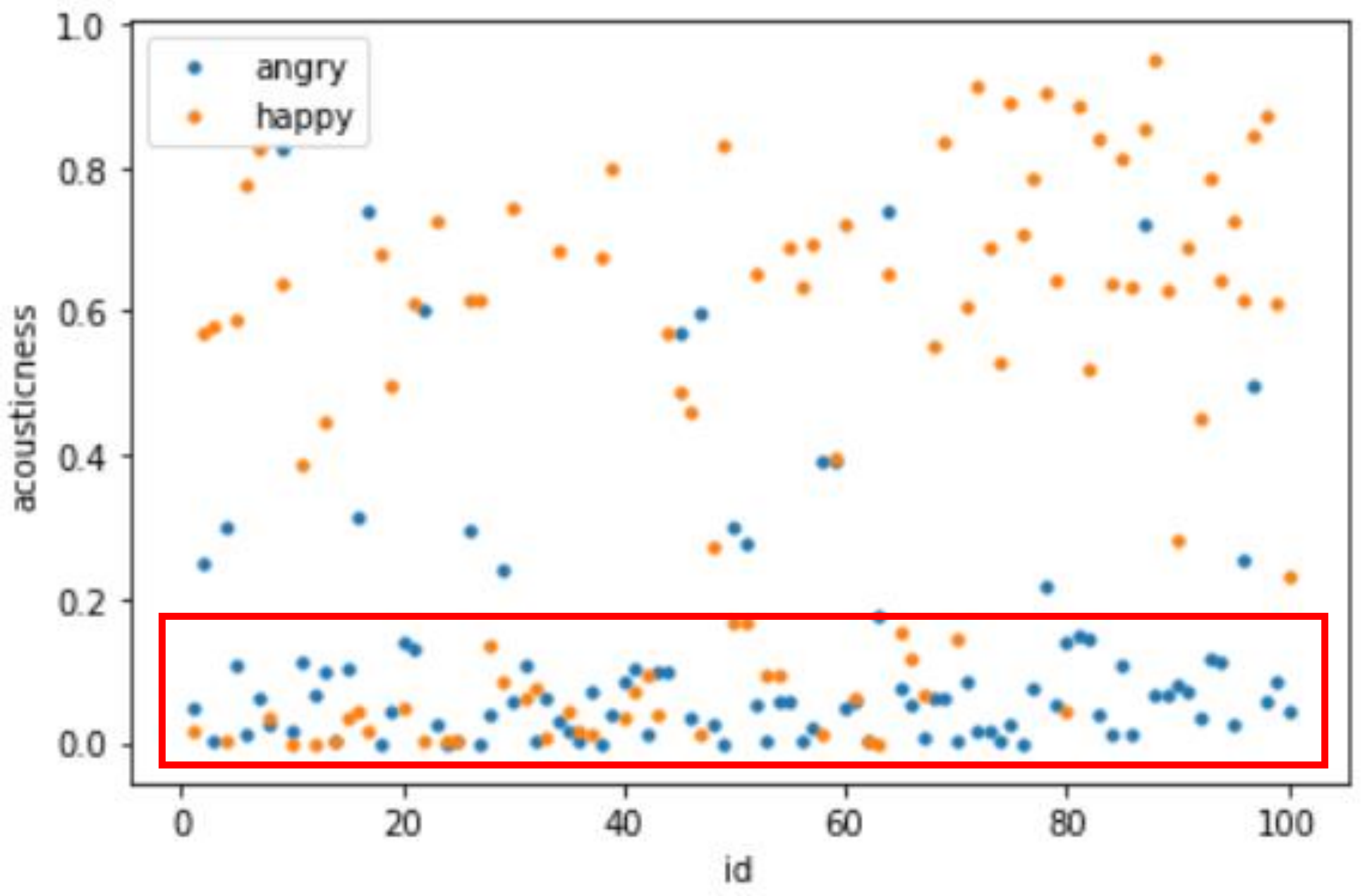
Features Analyze



angry → energy高、loudness大

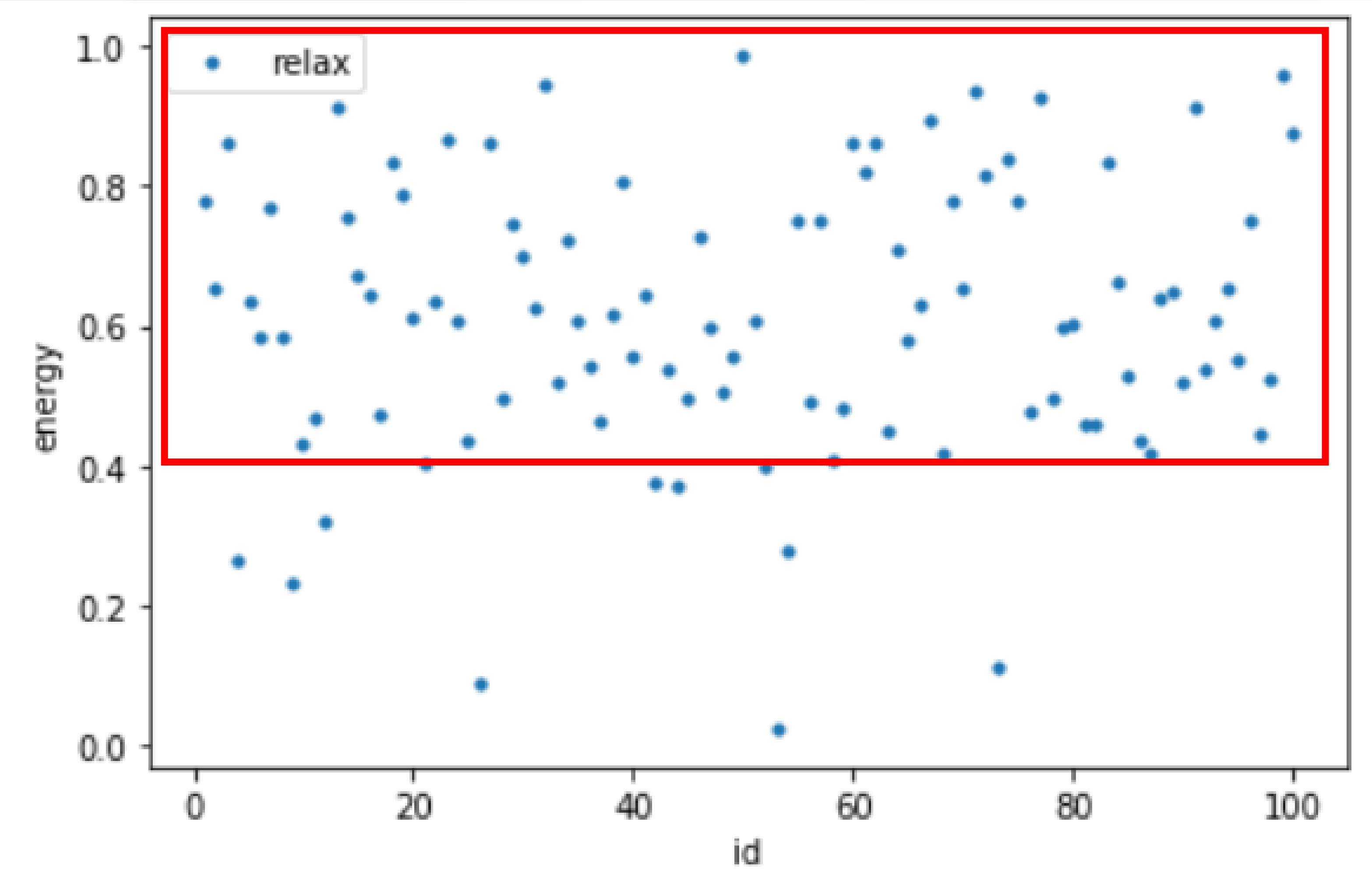
my dataset

Features Analyze



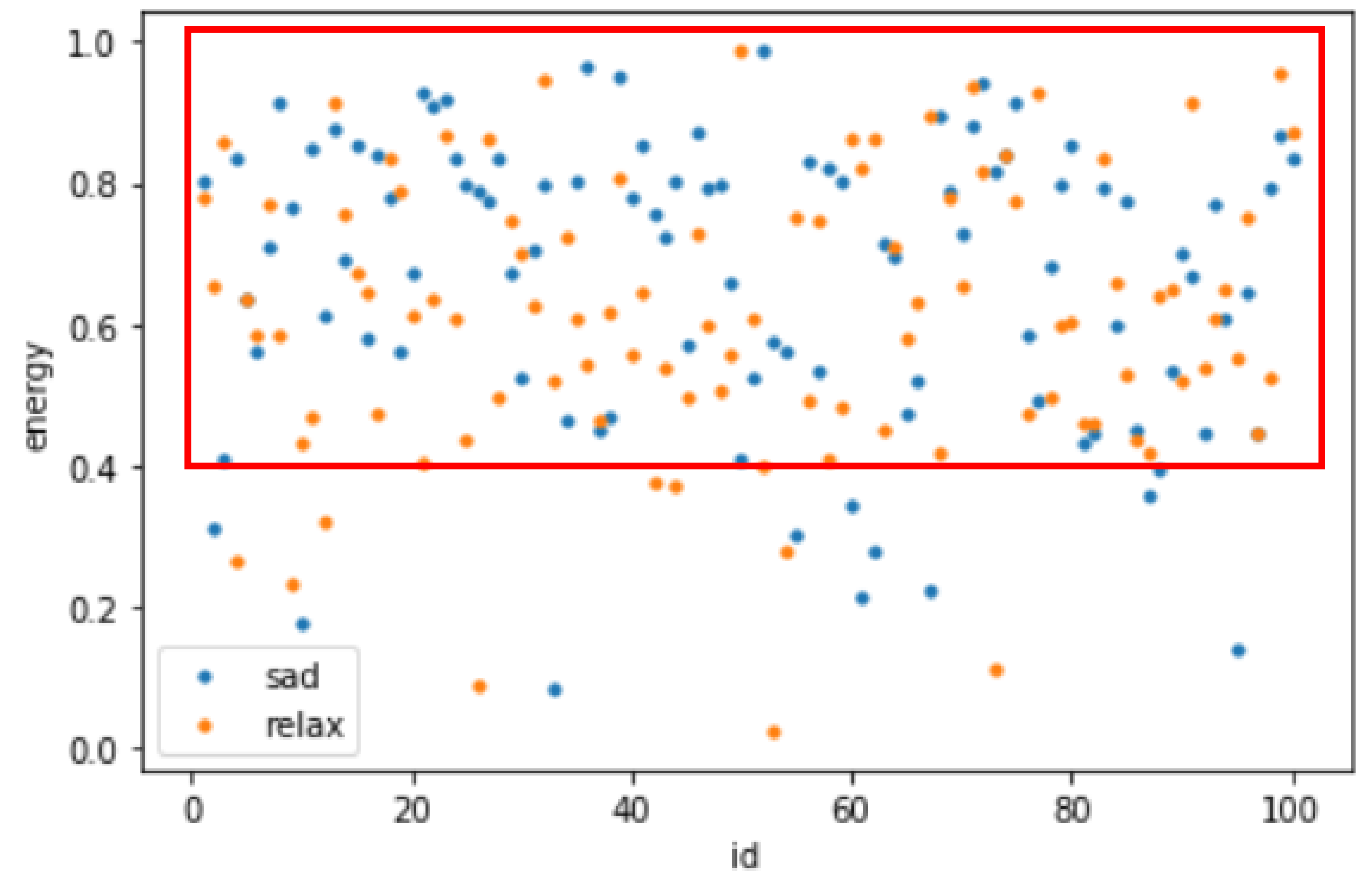
angry → acousticness低

Features Analyze



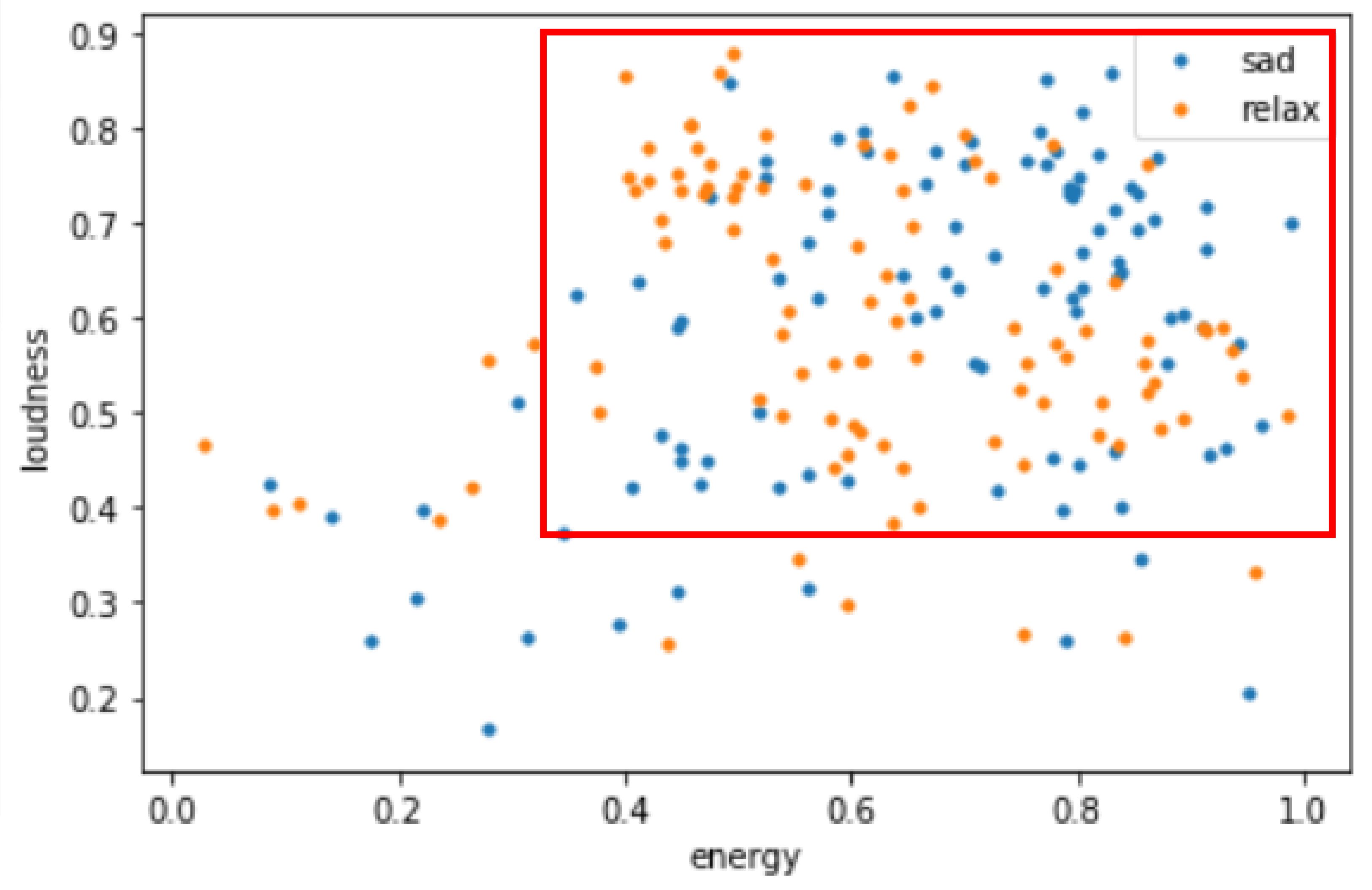
relax → energy高

Features Analyze



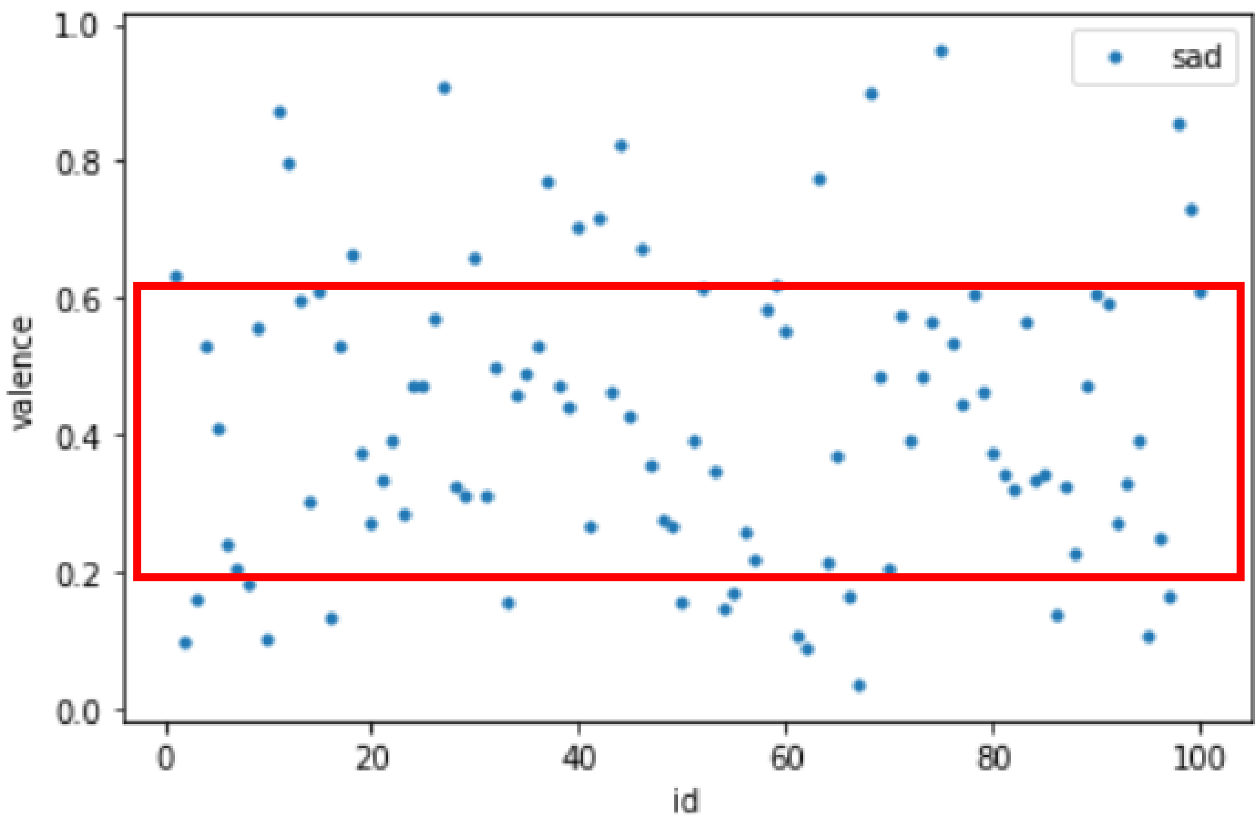
sad、relax → energy高

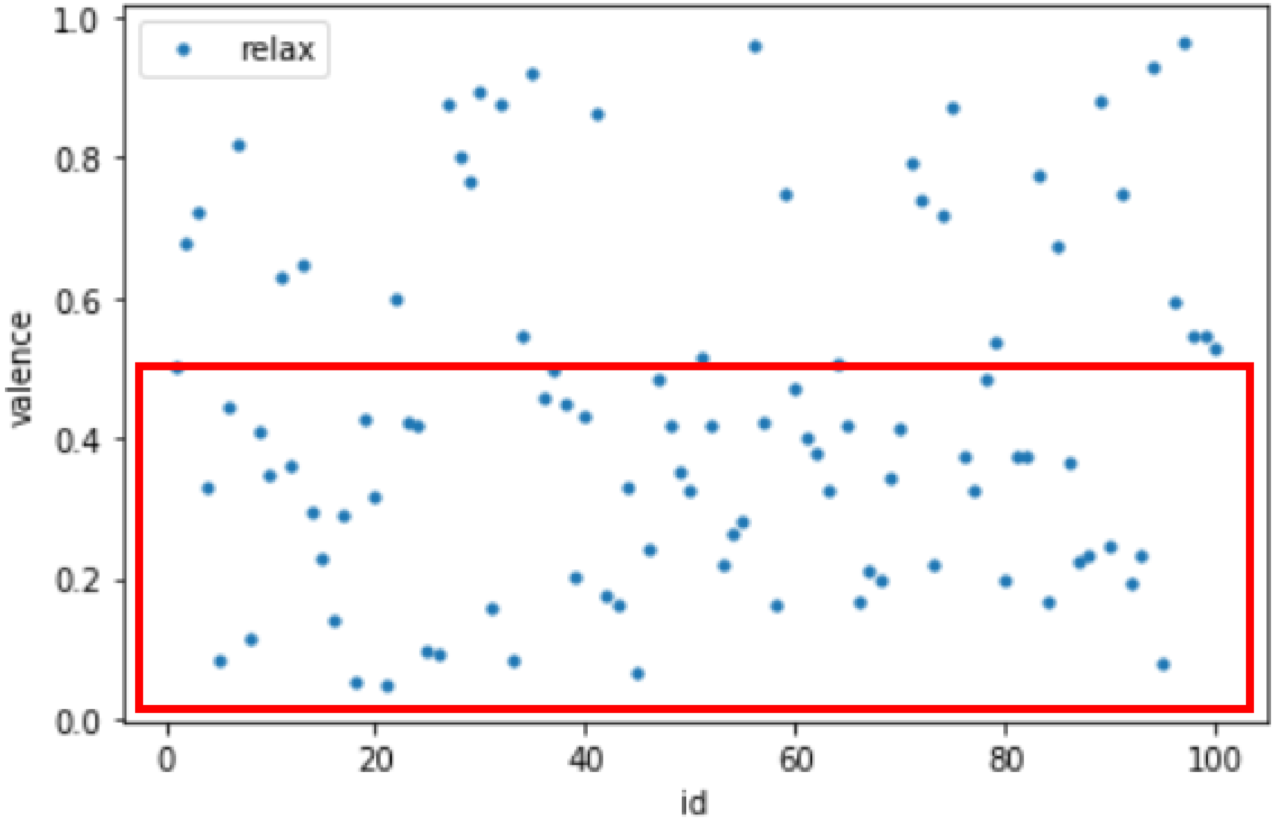
Features Analyze



sad、relax → loudness大、energy高

Features Analyze

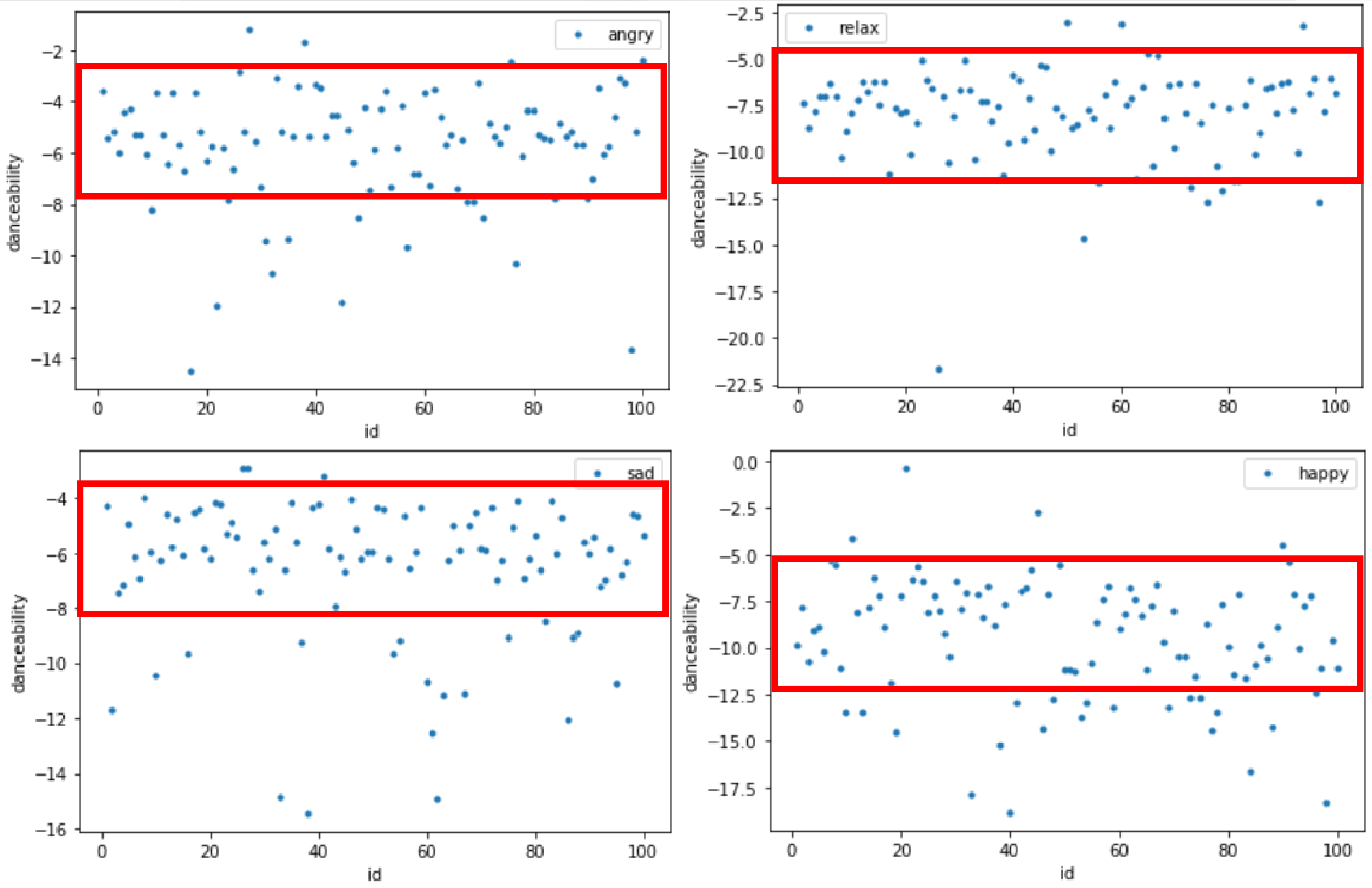




sad → valence (0.2~0.6)

relax → valence (0.0~0.5)

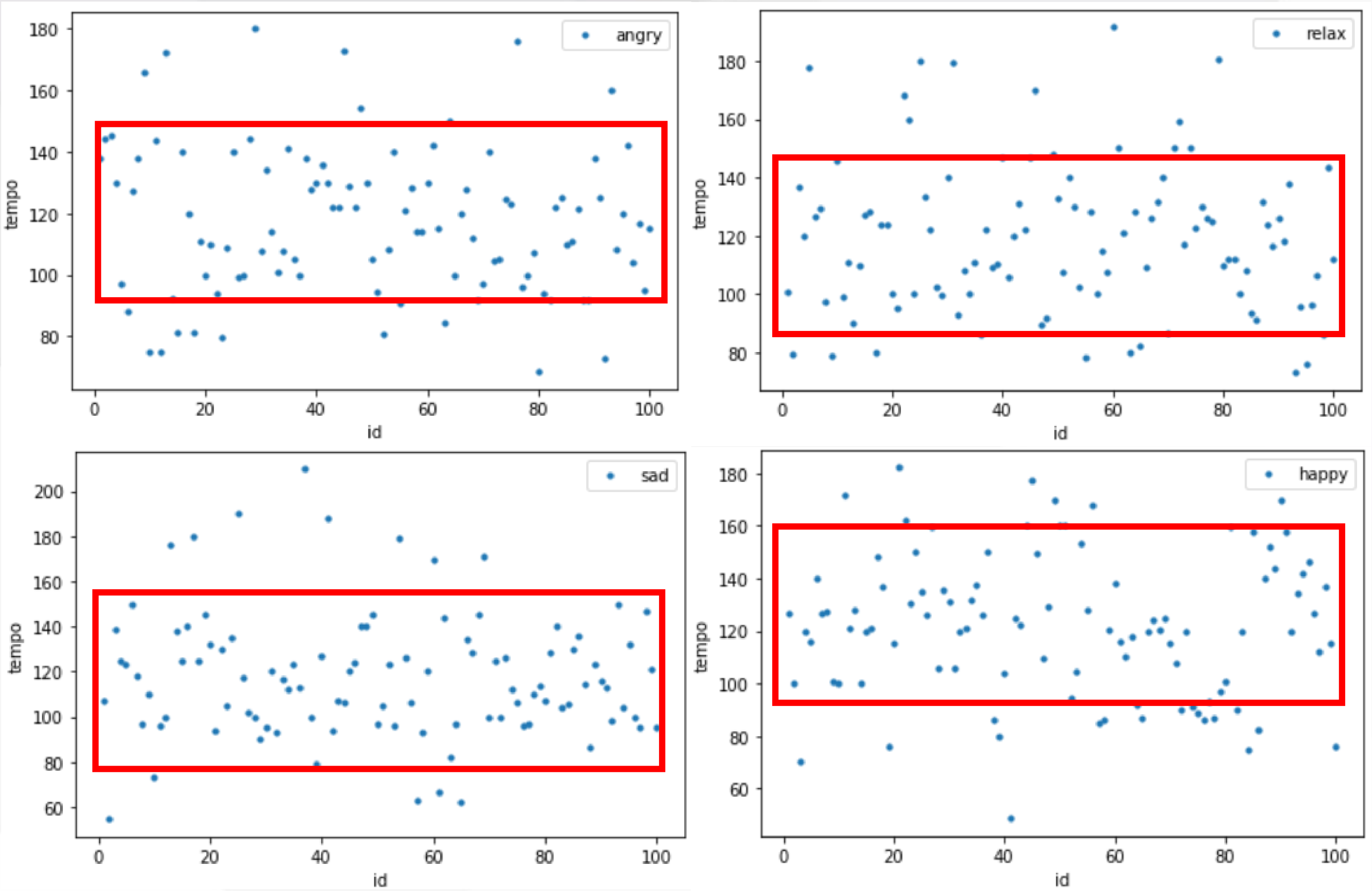
Features Analyze



angry → danceability(-3.5~-8) / sad → danceability(-4~-8)

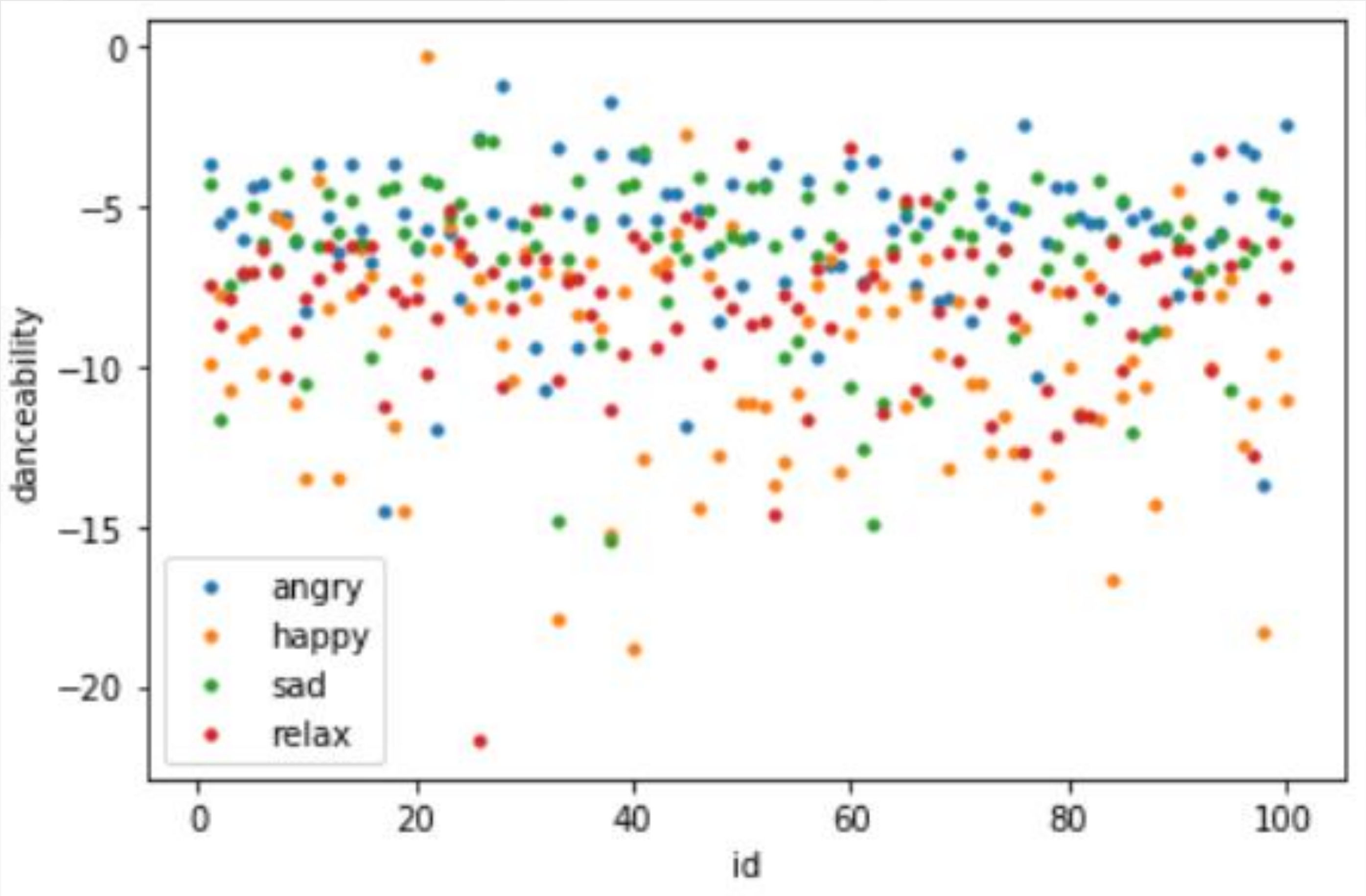
relax → danceability(-5~-11) / happy → danceability(-5~-15)

Features Analyze



angry → tempo(90-150) / sad → tempo(80-150) / relax → tempo(90-150) / happy → tempo(100-160)

Features Analyze



Features Analyze

happy、angry → loudness大 (✓)

angry → energy高、loudness大、acousticness低 (✓)

sad、relax → loudness大 (✓)、energy高

sad → valence (0.2~0.6)

relax → valence (0.0~0.5)

sad → valence低

relax → loudness大、tempo(80-140)

happy、angry → energy高、loudness大、 acousticness低

angry → tempo(100-175)

Spotify切割區段

Spotify Audio Features

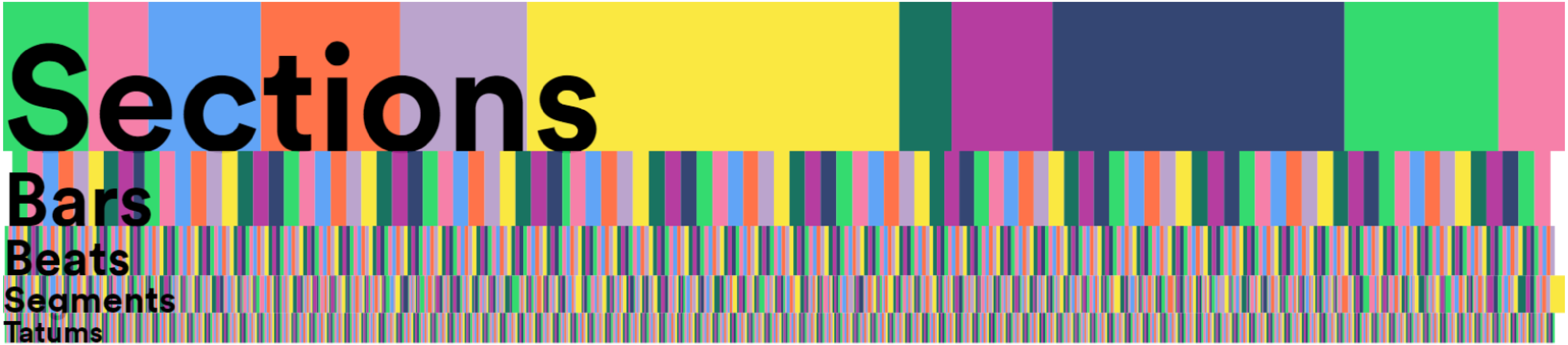
Learn more about the audio properties of your favourite tracks, including detailed rhythmic information.

To get these values, we use the Spotify API's Get Audio Analysis for a Track endpoint.

Let's search for a track:

And Now The Day Is Done | SUBMIT

- Now the Day is Done - Frank Howard
- And Now The Day Is Done - Ron Sexsmith



Spotify切割區段

Spotify Audio Features

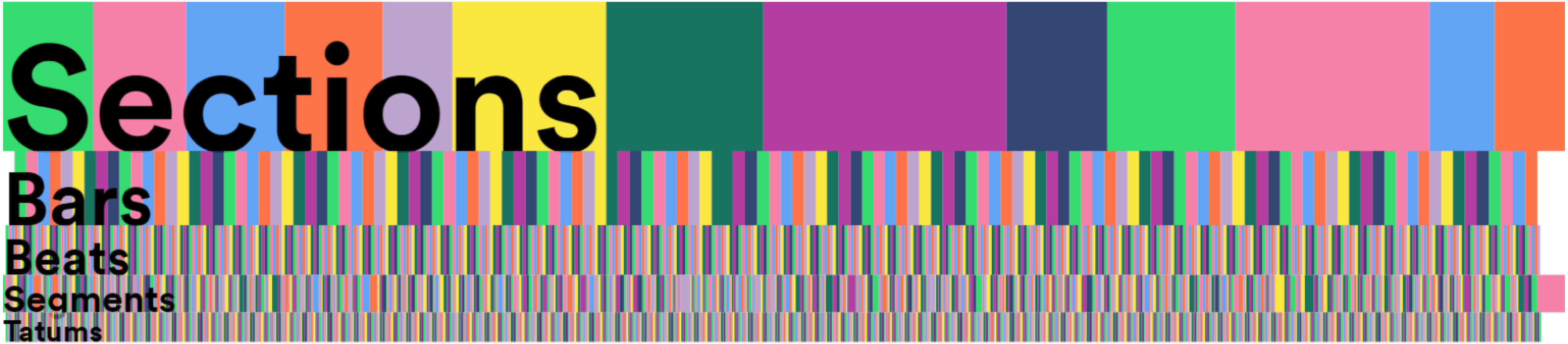
Learn more about the audio properties of your favourite tracks, including detailed rhythmic information.

To get these values, we use the Spotify API's Get Audio Analysis for a Track endpoint.

Let's search for a track:

Almost Lover SUBMIT

- Almost Lover - A Fine Frenzy
- Almost Lover - Jasmine Thompson



Spotify切割區段 - Audio Analysis Object

KEY	VALUE TYPE	VALUE DESCRIPTION
bars	an array of time interval objects	The time intervals of the bars throughout the track. A bar (or measure) is a segment of time defined as a given number of beats. Bar offsets also indicate downbeats, the first beat of the measure.
beats	an array of time interval objects	The time intervals of beats throughout the track. A beat is the basic time unit of a piece of music; for example, each tick of a metronome. Beats are typically multiples of tatums.
sections	an array of section objects	Sections are defined by large variations in rhythm or timbre, e.g. chorus, verse, bridge, guitar solo, etc. Each section contains its own descriptions of tempo, key, mode, time_signature, and loudness.
segments	an array of segment objects	Audio segments attempts to subdivide a song into many segments, with each segment containing a roughly consitent sound throughout its duration.
tatums	an array of time interval objects	A tatum represents the lowest regular pulse train that a listener intuitively infers from the timing of perceived musical events (segments). For more information about tatums.

Spotify Accounts Authentication

download node.js

```
λ npm install
```

- authorization_code
- client_credentials
- implicit_grant
- node_modules
- .gitignore
- LICENSE
- package.json
- package-lock.json
- README.md

app.js | index.html

```
var express = require('express'); // Express web server framework
var request = require('request'); // "Request" library
var cors = require('cors');
var querystring = require('querystring');
var cookieParser = require('cookie-parser');

var client_id = '07f9611e9b234caea4fcee288da82e61'; // Your client id
var client_secret = '087b1a26a1294bc58a0a89d4a29463e4'; // Your secret
var redirect_uri = 'http://localhost:8888/callback'; // Your redirect uri

/**
 * Generates a random string containing numbers and letters
 * @param  {number} length The length of the string
 * @return {string} The generated string
 */
var generateRandomString = function(length) {
  var text = '';
  var possible = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789';

  for (var i = 0; i < length; i++) {
    text += possible.charAt(Math.floor(Math.random() * possible.length));
  }
  return text;
};

var stateKey = 'spotify_auth_state';

var app = express();

app.use(express.static(__dirname + '/public'))
   .use(cors())
   .use(cookieParser());

app.get('/login', function(req, res) {

  var state = generateRandomString(16);
  res.cookie(stateKey, state);

  // your application requests authorization
  var scope = 'user-library-read user-read-private user-read-email';
  res.redirect('https://accounts.spotify.com/authorize?' +
    querystring.stringify({
      response_type: 'code',
      client_id: client_id,
      scope: scope,
```

Using your own credentials

Spotify Accounts Authentication

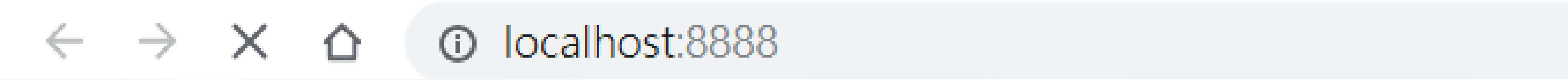
```
λ cd D:\中興資管所\7 實驗進度\音頻情緒分類\web-api-auth-examples-master\authorization_code
```

```
λ node app.js
```

Cmder

```
D:\Software\Cmder
λ cd D:\中興資管所\7 實驗進度\音頻情緒分類\web-api-auth-examples-master\authorization_code

D:\中興資管所\7 實驗進度\音頻情緒分類\web-api-auth-examples-master\authorization_code
λ node app.js
Listening on 8888
```



current_user_saved_tracks()

print the track that the user saved

```python
# 歌單中的歌名以及歌手名稱(最爱的歌曲)
sp = spotipy.Spotify(auth=token)
results = sp.current_user_saved_tracks()
print("最爱的歌曲：")
for item in results['items']:
    track = item['track']
    print ('| - ' + track['name'] + ' | ' + track['artists'][0]['name'])
```

lyrics emotion

LogisticRegression方法

```
LogisticRegression方法 Testing accuracy score: 0.7584269662921348
LogisticRegression方法 Traing accuracy score: 0.9316901408450704
LogisticRegression方法 confusion matrix
[[71 17  3  2]
 [ 2 83  2  0]
 [11 26 48  6]
 [ 5  9  3 68]]
```

LinearSVC方法

```
LinearSVC方法 Testing accuracy score: 0.6769662921348315
LinearSVC方法 Traing accuracy score: 0.9316901408450704
LinearSVC方法 confusion matrix
[[71 17  3  2]
 [ 2 83  2  0]
 [11 26 48  6]
 [ 5  9  3 68]]
```

lyrics emotion

LogisticRegression方法

In [11]:

```
pred=model.predict(X_test)
print("Testing accuracy score: " + str(model.score(X_test, y_test)))
```

```
Testing accuracy score: 0.3177570093457944
```

LinearSVC方法

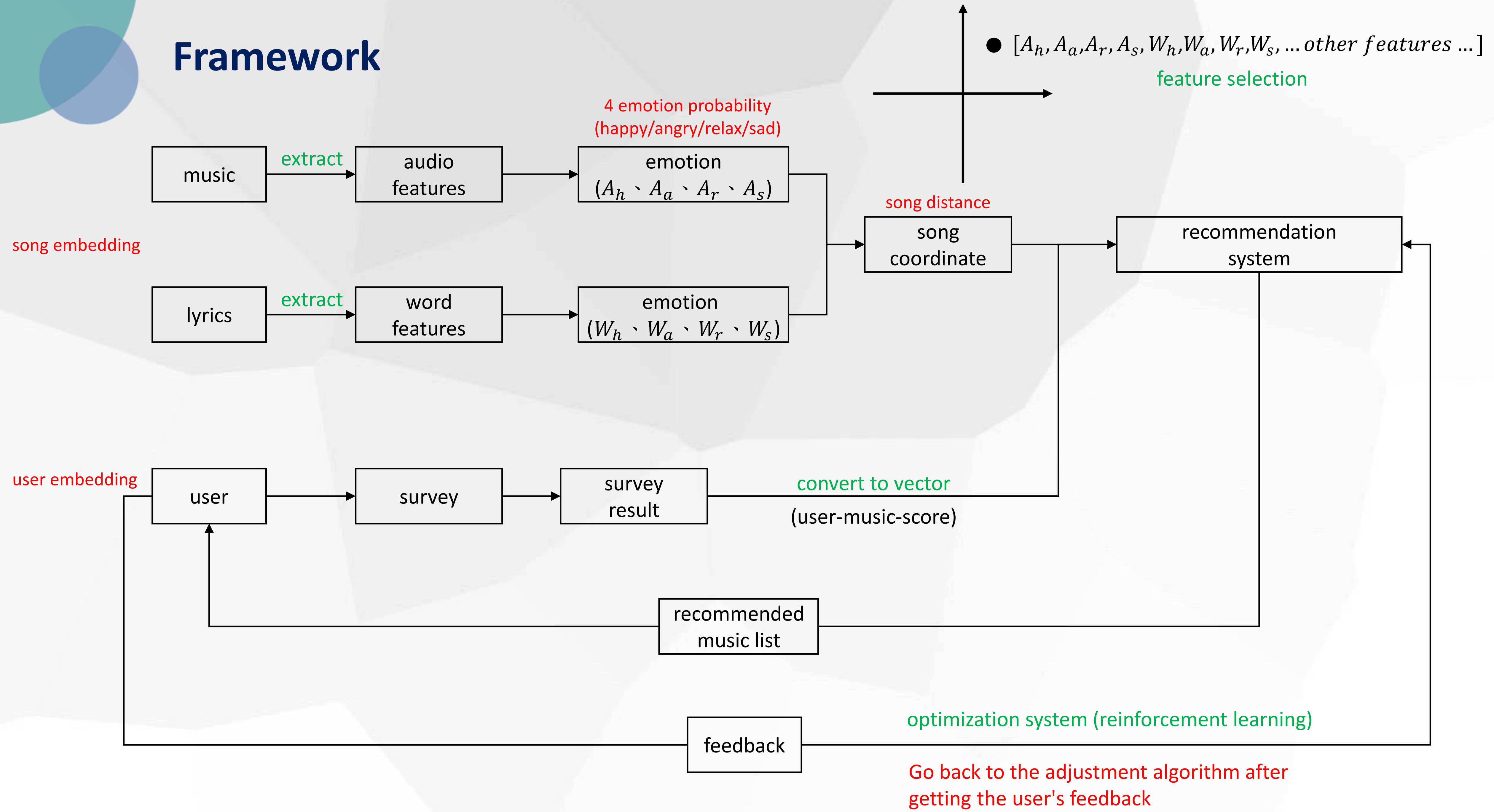
In [13]:

```
#LinearSVC方法
linear_svc = LinearSVC(C=1.0, penalty='l1', max_iter=3000, dual=False)
model2 = linear_svc.fit(X_train,y_train)
pred = model2.predict(X_test)
print("LinearSVC Testing accuracy score: " + str(model2.score(X_test, y_test)
```

```
LinearSVC Testing accuracy score: 0.30218068535825543
```

lyrics0426(1-1071)_d.csv

Framework



$[A_h, A_a, A_r, A_s, W_h, W_a, W_r, W_s, \ldots other\ features \ldots]$
feature selection
4 emotion probability
(happy/angry/relax/sad)
music
extract
audio features
emotion
$(A_h$ 、 A_a 、 A_r 、 $A_s)$
song distance
song coordinate
recommendation system
song embedding
lyrics
extract
word features
emotion
$(W_h$ 、 W_a 、 W_r 、 $W_s)$
user embedding
user
survey
survey result
convert to vector
(user-music-score)
recommended music list
feedback
optimization system (reinforcement learning)
Go back to the adjustment algorithm after getting the user's feedback

Survey Page

Enter your information

Username

Gender Male Female

Age

NEXT

Survey Page

How many songs take as a reference ? (give several songs for initial user to rate)

Score the following songs according to your preferences

play for 30s

1 5

Music 1

Music 2

Music 3

Music 4

Music 5

Music 6

Music 7

Music 8

OK

Preferences List

5	Music 5
4	Music 3 、Music 6 、Music 8
3	Music 2 、Music 7
2	Music 4
1	Music 1

data : user-music-score

THANKS!

chiouchingyi@smail.nchu.edu.tw