Emotion Patterns in Music Playlists

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Second Project meeting

- Introduction
- 2 Existent emotion classifiers
- Supplies Temporal Stript
 Stript
- 4 References

- Introduction
- 2 Existent emotion classifiers
- 3 Lyrics Downloader Script
- 4 References



Introduction

Previously On Sara&Mario Project

In the previous meeting we analyzed the state-of-the-art of Emotion Detection.

Next steps:

- Analyze existent emotion classifiers
- Statistics and details about MoodyLyrics
- Natural language processors (nlptoolkit, scipy, spaCy) and embedders (word2vect, fasttext)
- Start workin!



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- 3 Lyrics Downloader Script
- 4 References

Emotion classifiers analysis

The emotion classifiers APIs we analyzed are:

- IBM Watson NLU
- IBM Watson Tone Analyzer
- ParallelDots AI
- Qemotion

1) IBM Watson: Natural Language Understanding (I)

Watson is a **question answering computer** system capable of answering questions posed in **natural language**, developed by IBM.[2]

Cool story

In 2011, the Watson computer system competed on Jeopardy! against legendary champions Brad Rutter and Ken Jennings winning the first place prize of \$1 million [2]

1) IBM Watson: Natural Language Understanding (II)

Natural Language Understanding is a collection of **APIs** that allows to:[1]

- Recognize the overall sentiment, in a scale from negative to positive [-1,1];
- Detect the emotion percentage between: joy, anger, disgust, sadness, fear;
- Determine keywords ranked by relevance;
- Extract entities: people, companies, organizations, cities and other information;
- Classify content into a hierarchical categories;
- Identify general concepts that may not be directly referenced in the text;
- Distinguish the semantic roles parsing sentences into subject, action and object.

1) IBM Watson NLU: Demo (I)

Overall Sentiment

Results obtained analyzing Oasis - Wonderwall lyrics (I).

-0.31 Text Relevance 0.95 way anybody 0.85 Overall Emotion wonderwall 0.67 Disgust □ 0.03 Sadness ■ 0.59 Fear ■ 0.33 Joy ____ 0.06 Anger ■ 0.27 0.52 lights 0.51 0.49 Hierarchy Score 0.32 / art and entertainment / music / music genres / hip hop 0.69 doubt 0.30 0.29 / law, govt and politics / legal issues / death penalty 0.34 0.29 word / hobbies and interests / magic and illusion 0.31

1) IBM Watson NLU: Demo (II)

Results obtained analyzing Oasis - Wonderwall lyrics (II).

Concept	Score
2008 singles	0.95
2009 singles	0.91
2005 singles	0.75
Billboard Alternative Songs number-one singles	0.74
Number-one singles in New Zealand	0.74
Journey	0.65
Wonderwall	0.64
English-language films	0.63

Name	Туре	Score
Backbeat	Company	0.86

That they re gonna throw it back to you Subject

2) IBM Watson: Tone Analyzer

It uses linguistic analysis to detect joy, fear, sadness, anger, analytical, confident and tentative tones found in text. [3]

Possible sources

Tweets, Online Review, Email message, your own text.

It uses both:

- the document level: to get a sense of the overall tone
- and the **sentence level**: to identify specific areas of your content where tones are the strongest.

The results obtained with Oasis - Wonderwall are identical to the ones obtained from IBM Watson: NLU

3) ParallelDots APIs: Demo

Their **Emotion Analysis classifier** is trained on their proprietary dataset and tells whether the underlying emotion behind a message is: **Happy, Sad, Angry, Fearful, Excited, Funny or Sarcastic.**[4] The result obtained analyzing **Oasis** - **Wonderwall** lyrics is showed in the following figure.

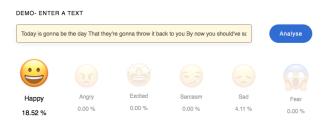


Figure 1: Output for Oasis - Wonderwall

4) Qemotion

Qemotion detects the main emotion of the speech and will define the corresponding emotion in terms of **temperature** (literally temperature) [5].

- \bullet From 31°C to 40°C \rightarrow Happiness
- ullet From 21°C to 30°C ightarrow Surprise
- From 11°C to $20^{\circ}\text{C} \rightarrow \text{Calm}$
- From 6° C to 10° C \rightarrow Fear
- From -5° C to 5° C \rightarrow Sadness and Disappointment
- ullet From -14°C to $-6^{\circ}\text{C} o \text{Anger}$
- From -20° C to -15° C \rightarrow Disgust

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lyrics_downloader.py (1)

We wrote a Python script for downloading lyrics. We used:

- MoodyLyrics to get songs information (artist, title and emotion)
- LyricWikia to download the lyrics

lyrics_downloader.py (2)

Our script produces in output:

- A folder containing lyrics in files named: *EMOTION_ARTIST_TITLE-OF-SONG*
- A log file in which we keep track of the errors we found

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References

- [1] IBM Watson: Natural Language Understanding APIs https://www.ibm.com/watson/services/ natural-language-understanding/
- [2] IBM Watson Wikipedia https://en.wikipedia.org/wiki/Watson_(computer)
- [3] IBM Watson: Tone Analyzer https://en.wikipedia.org/wiki/Watson_(computer)
- [4] ParallelDots APIs https://tone-analyzer-demo.ng.bluemix.net/
- [5] Qemotion
 http://www.qemotion.com/demo.php

