

# Emotion Patterns in Music Playlists

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Second Project meeting

# Table of Contents

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

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- 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!

# Table of Contents

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

# Emotion classifiers analysis

The emotion classifiers APIs we analyzed are:

- 1 IBM Watson NLU
- 2 IBM Watson Tone Analyzer
- 3 ParallelDots AI
- 4 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)

Results obtained analyzing **Oasis - Wonderwall** lyrics (I).

## Overall Sentiment

Negative  -0.31

## Overall Emotion

Joy  0.06    Anger  0.27    Disgust  0.03    Sadness  0.59    Fear  0.33

## Hierarchy

/ art and entertainment / music / music genres / hip hop  0.69

/ law, govt and politics / legal issues / death penalty  0.34


/ hobbies and interests / magic and illusion  0.31

## Score

Text Relevance

way  0.95

anybody  0.85

wonderwall  0.67

roads  0.52

lights  0.51

things  0.49

ta  0.32

doubt  0.30


heart  0.29

word  0.29

# 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	Type	Score
Backbeat	Company	 0.86

That they 're gonna throw it back to you  
Object 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**.<sup>[4]</sup>

The result obtained analyzing **Oasis - Wonderwall** lyrics is showed in the following figure.

DEMO- ENTER A TEXT

Today is gonna be the day That they're gonna throw it back to you By now you should've sc

Analyse



Happy

18.52 %



Angry

0.00 %



Excited

0.00 %



Sarcasm

0.00 %



Sad

4.11 %



Fear

0.00 %

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].

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

# Table of Contents

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

# 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



# Table of Contents

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

# References

- [1] IBM Watson: Natural Language Understanding APIs  
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- [2] IBM Watson - Wikipedia  
[https://en.wikipedia.org/wiki/Watson\\_\(computer\)](https://en.wikipedia.org/wiki/Watson_(computer))
- [3] IBM Watson: Tone Analyzer  
[https://en.wikipedia.org/wiki/Watson\\_\(computer\)](https://en.wikipedia.org/wiki/Watson_(computer))
- [4] ParallelDots APIs  
<https://tone-analyzer-demo.ng.bluemix.net/>
- [5] Qemotion  
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