

Emotion Patterns in Music Playlists

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First Project meeting

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Sentimental Analysis (SA)

Definition

Sentiment Analysis (SA) is the computational study of people's opinions, attitudes and emotions toward an entity.

Entity = individuals, events or topics.

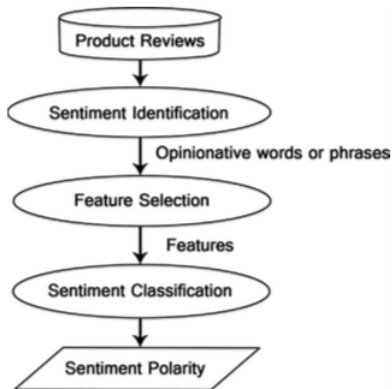


Figure 1: Sentiment analysis process on product reviews

Sentiment analysis: a classification problem

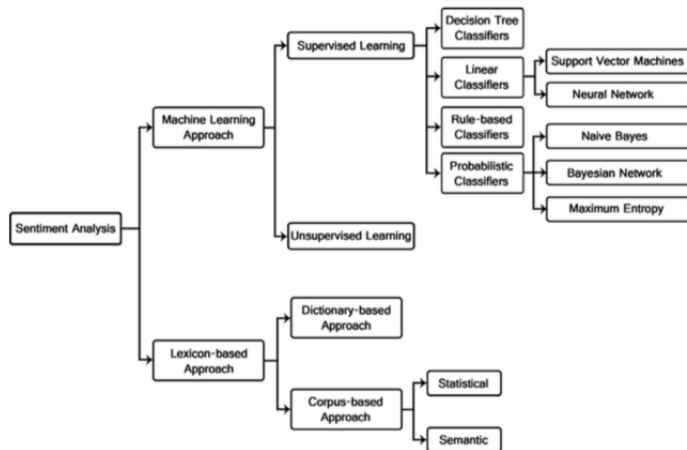


Figure 2: Sentiment classification techniques

Emotion Detection (ED)

Definition

Emotion detection is the process of identifying human emotions.

Remark

Emotion Detection (ED) is a SA task.

SA → detects positive or negative feeling from text.

ED → detects various emotions.

Emotion Detection: Why

Emotion detection has useful applications, such as:

- Measure citizens happiness
- Pervasive computing
- Understanding customers

Our goal

Unravel emotion patterns in the playlists

Emotion Detection: Challenges

(Some of the) Biggest challenges in ED:

- Context-dependence of emotions \Rightarrow people use different emotion regulation strategies in different social contexts
- Word-sense disambiguation \Rightarrow identifying which sense of a word (i.e. meaning) is used in a sentence, when the word has multiple meanings
- Co-reference resolution \Rightarrow pronouns and other referring expressions must be connected to the right individuals
- Lack of labelled emotion database

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Methods for Emotion Detection

Methods used for text based emotion detection are:

- ① Keyword Spotting
- ② Lexical Affinity
- ③ Learning-based
- ④ Hybrid

1. Keyword spotting method

Finding occurrences of keywords from a given set. These words are classified into categories such as disgusted, sad, happy, angry, etc.

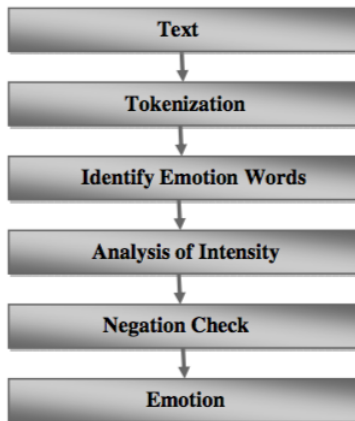


Figure 3: Keyword Spotting Technique

2. Lexical Affinity method

Is an extension of keyword spotting technique: apart from picking up emotional keywords it assigns probabilistic 'affinity' for a particular emotion to arbitrary words.

Disadvantages:

- assigned probabilities are biased toward corpus-specific genre of texts
- it misses out emotion content that resides deeper than the word-level

Example

"I avoided an accident"

"I met my girlfriend by accident"

3. Learning-based methods

Remark

FROM determine emotions TO classify the input texts into different emotions

Learning based methods try to detect emotions based on a previously trained classifier, which apply various theories of machine learning such as SVM.

Limitations

Major limitations:

- Ambiguity in keyword definition
- Incapability of recognizing sentences without keywords
- Lack of linguistic information
- Difficulties in determining emotion indicators

Example

“I passed my qualify exam today”
“Hooray! I passed my qualify exam today”

Example

“He laughed at me”
“I laughed at him”

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How many sentiments?

Human can have an enormous range of different sentiments and moods

- Anger
- Sadness
- Happiness
- Surprise
- Fear
- Disgust
- ... Which of them may be related to lyrics?

How to label them?

We may label lyrics to be exactly related to one mood/sentiment.

- Is it accurate?
- Is it possible that one song express more sentiments? → Sliders approach

The “sliders” approach

Assigning a value to each possible sentiment may be more flexible.



Figure 4: Sliders for emotion labelin

Do we really need this level of flexibility in our application?

Emotion Dimensions

Current systems tends to classify emotions according to two dimensions

- Arousal
- Valence

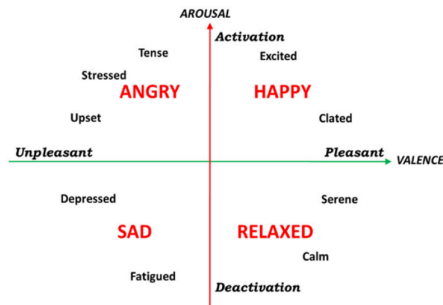


Figure 5: Emotion Classification Scheme

Feature Selection

Which textual features are we interested in?

- Terms presence and frequency
- Adjectives
- Opinion Words and Phrases
- Negation expressions

Classification Levels (I)

Three possible classification levels:

- Document Level
 - The whole document is the classification unit
- Sentence Level
 - Sentences are the basic classification units
- Aspect Level
 - Classify sentiments with respect to entities and their aspects

Classification Levels (II)

Document level classification suits our problem

- We will analyze lyrics
- Lyrics are (usually) small documents focused on a single topic
- We can treat lyrics as our classification unit

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Datasets

There are very few datasets which could suits our case

- MoodyLyrics is the most relevant example of that¹
 - It uses only 4 emotions (Happy, Sad, Angry and Relaxed)
 - Is it enough?

¹Look at the references for the releated article

What we learnt

- Defining the number of moods we want to consider is not an easy task but probably we don't need many of them because our analysis domain is restricted to songs
- The "sliders" approach is too general. Songs are usually linked with a single sentiment
- We should not overcomplicate our emotion range
- Using already annotated lyrics datasets could be helpful

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