Emotion Patterns in Music Playlists

Sara Giammusso[12] Mario Guerriero [12]

[1]Data Science Department, EURECOM, Télécom ParisTech, France
[2]Department of Control and Computer Engineering, Politecnico di Torino, Italy

First Project meeting

Table of Contents

Table of Contents

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.

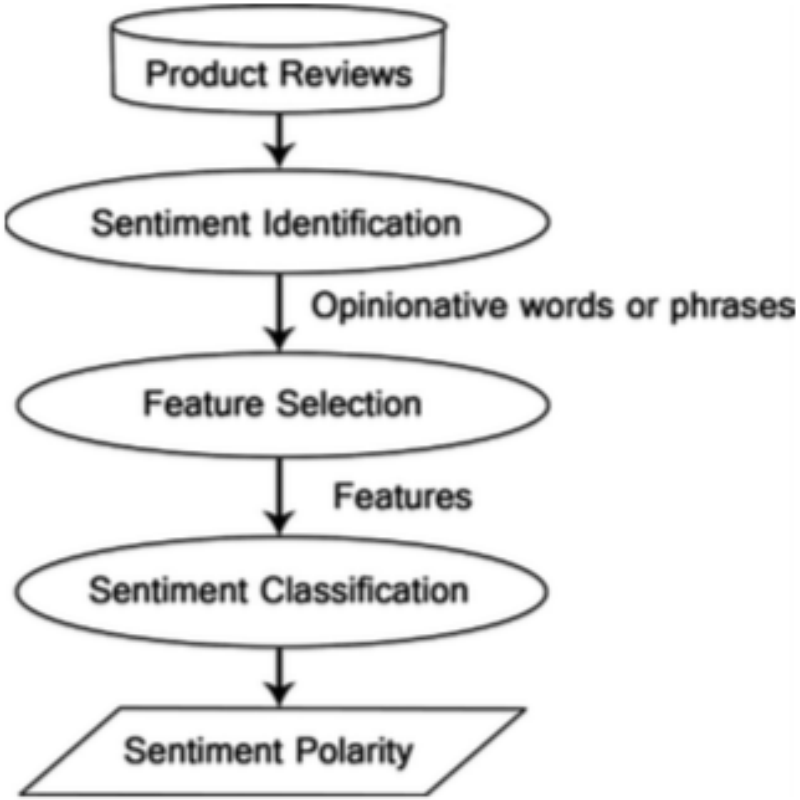


Figure 1: Sentiment analysis process on product reviews

Sentiment analysis: a classification problem

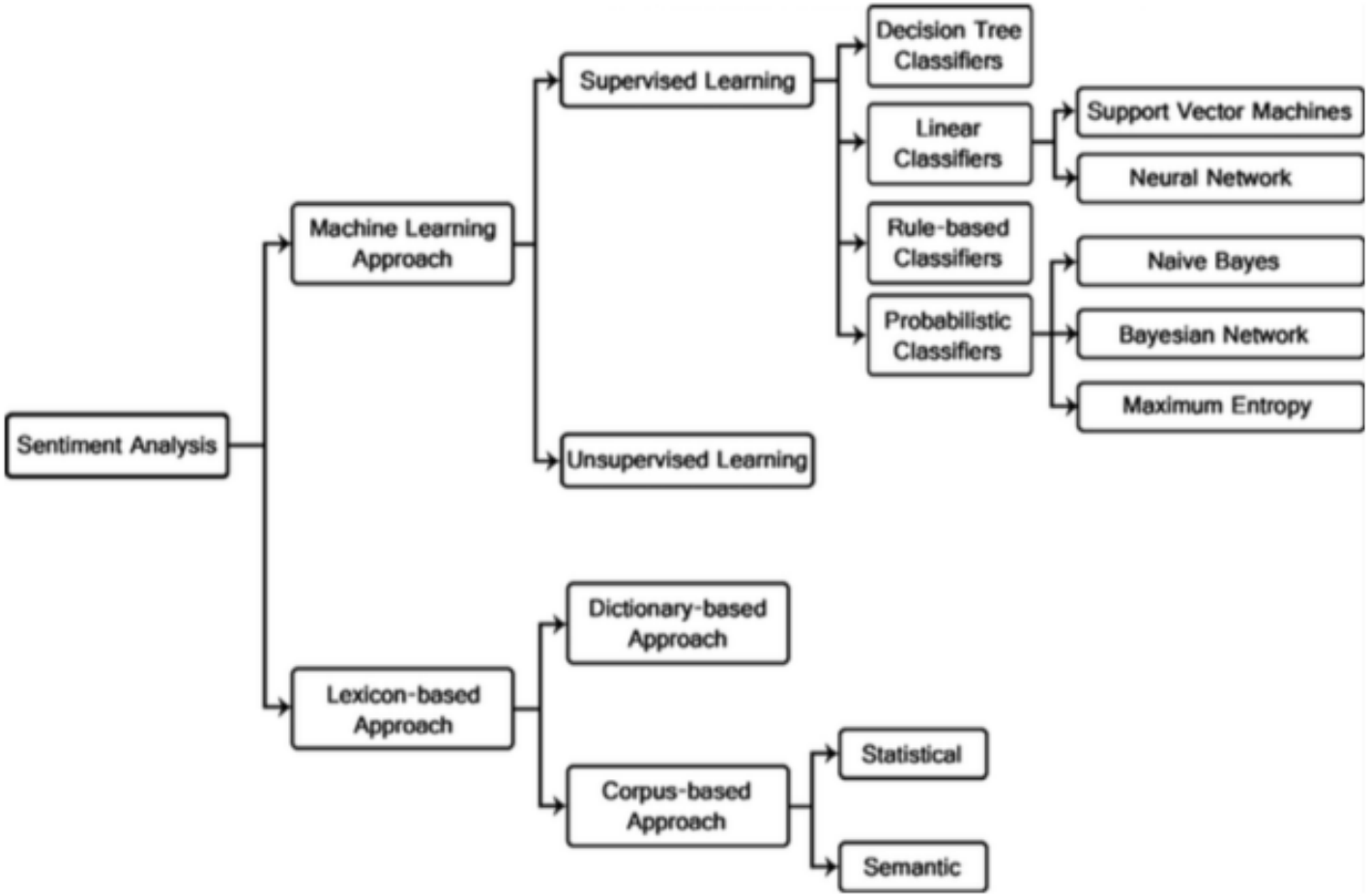


Figure 2: Sentiment classification techniques

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.
As a SA task, ED can be implemented using:

- ML approach
- Lexicon-based approach

Emotion Detection: Why

Emotion detection has useful applications, such as:

- Measure citizens happiness
- Pervasive computing
- Understanding the consumer

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

Table of Contents

Feature Selection

Which textual features are we interested in?

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

Feature Selection Methods

- Strings
  - Phrases representing emotional patterns
- Bag of Words (BoW)
  - Sort of keywords list
  - Make the classification process simpler

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

Table of Contents

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 releated to lyrics?

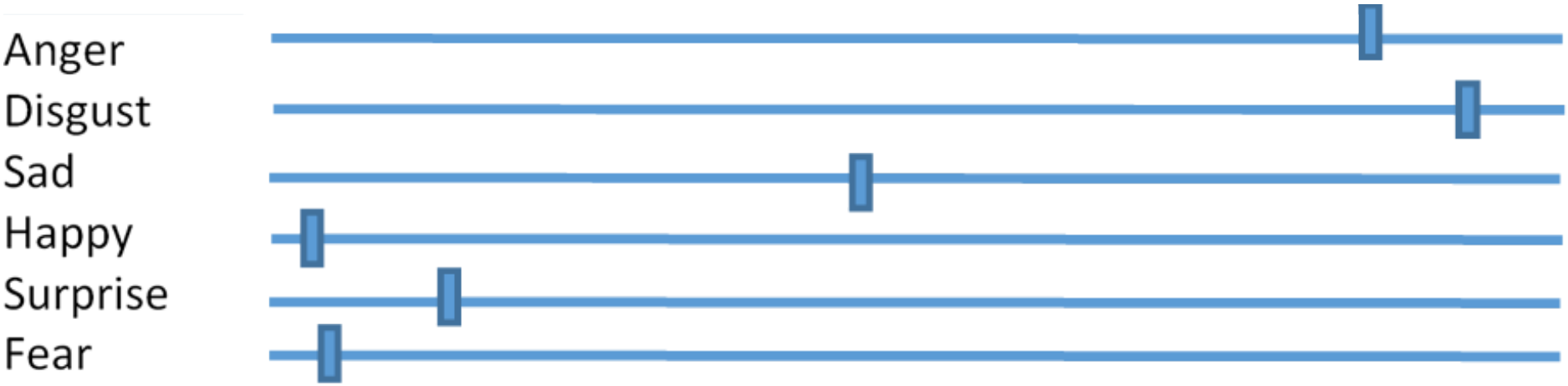
How to label them?

We may label lyrics to be exactly releated to one mood/sentiment

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

The "sliders" approach

Assigning a value to each possible sentiment may be more flexible



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

Table of Contents

Table of Contents

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

Table of Contents

References

- Microsoft Developer Blog (2015)
  Emotion detection and recognition from text using Deep Learning
  link
- Walaa Medhat, Ahmed Hassan, and Hoda Korashy (2014)
  Sentiment Analysis Algorithms and Applications: A Survey.
  Ain Shams Engineering Journal