



Sentiment Analysis and its Challenges

Topic Modelling & Sentiment Analysis

What we will cover

- » Sentiment Analysis & Applications
- » Measuring Sentiment
- » Challenges Faced



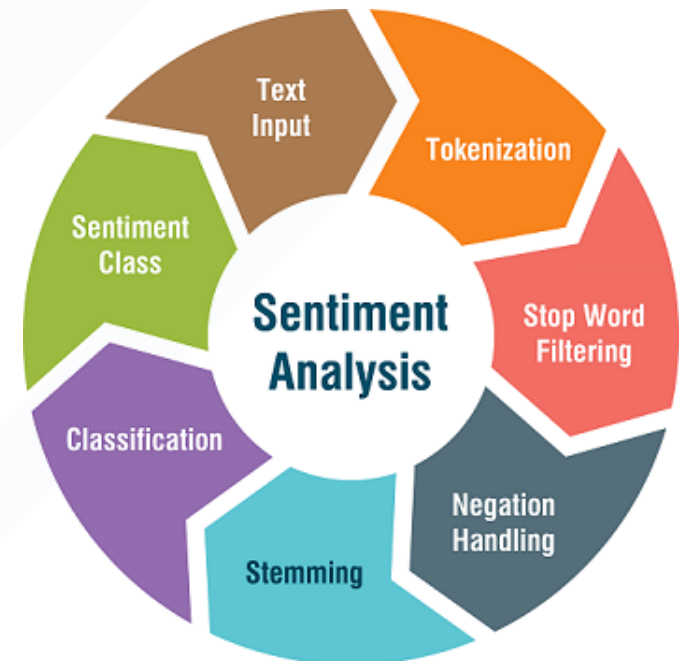
Sentiment Analysis & Applications

What is Sentiment?

- » A thought or view.... Based mainly on feelings instead of reason
 - Attitudes
 - Emotions
 - Opinions
- » Subjective, **NOT** facts

What is Sentiment Analysis (SA)?

- » A.k.a **Opinion Mining**
- » Use of natural language processing (NLP) and computational techniques to automate the extraction, identification or classification of sentiment from typically unstructured text



Why Sentiment Analysis?

Some examples...

- » **Public sentiment:** *What is consumer confidence index?*
- » **Products:** *Is the review positive or negative?*
- » **Prediction:** *Predict election outcomes / market trends*
- » **Social Media:** *Track response to ad campaigns or product launches based on tweets*

Applications of Sentiment Analysis

» Business and Organisations

- *Market intelligence*
- *Product & service benchmarking*

» Individuals

- *Consumer behaviour*
- *Opinions on politics*

Applications of Sentiment Analysis

» Advertisement Placement

- *Display ads based on customer reviews (good/bad)*

» Opinion Retrieval and Search

- *Search for opinions on particular issues or items*
- *→ Allow opinion search on specific aspects or features of items*

What are Opinions?

4 types of Opinions:

a. Regular & Comparative

Regular: An opinion in the literature.

"The picture quality is great."

Comparative: Expresses a relation of similarities or differences between two or more entities and/or a preference of the opinion holder based on some shared aspects of the entities.

"Coke tastes better than Pepsi."

What are Opinions?

b. Subjective & Fact-implied

Subjective: A regular/comparative opinion given in a subjective statement.

"Coke tastes better than Pepsi."

Fact-implied: A regular or comparative opinion implied in an objective or factual statement. Such an objective statement expresses a desirable or undesirable fact or action.

"My dad bought the car yesterday and it broke today."

What are Opinions?

c. First-person & Non-first person

First-person: It states one's own attitude towards an entity. It can be from a person, a representative of a group, or an organization.

"Tax increase is bad for the economy."

Non-first person: It is expressed by a person stating someone else's opinion..

"President Obama supports tax increase."

What are Opinions?

d. Meta-opinions

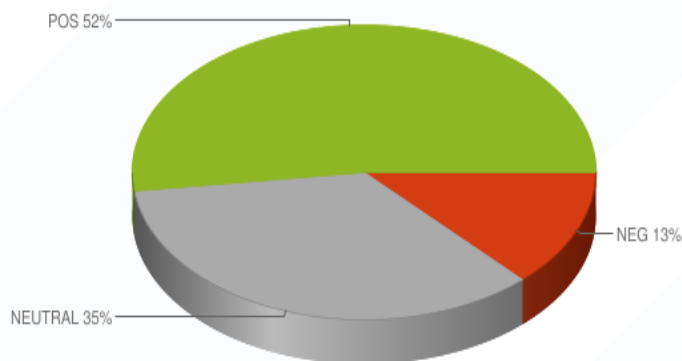
Meta-opinions are opinions about opinions.

"I am so upset that President Obama supports tax increase."

Measuring Sentiment

Polarity & Intensity

You will need a colour chart & a thermometer:



Polarity/ Valence

Intensity



Measuring Sentiment - Polarity

- » The roast duck is in the oven.
 - *Neutral*
- » The roast duck is delicious.
 - **Positive**
- » The roast duck is the worst I've ever tasted.
 - **Negative**
- » The roast duck is incredible.
 - *Hmmm... hard to say. It might just be a statement of fact.*
- » The roast duck is better than your mother's.
 - *Errrr... praising yet putting another person down?*

Measuring Sentiment - Polarity

"Sentiments are very different from conventional facts...

*'**Sinful**' is a good thing when applied to chocolate cake."*

~ Seth Grimes ~

Algorithm needs to **classify emotion**
by handling sarcasm, irony, idioms, slang etc.

Measuring Sentiment - Intensity

“I hate this!”

- (quietly) – The agony of waiting for a dental appointment.
- (laughing) – She actually liked being tickled.
- (pertulantly) – Her older brother gets to go out and she has to stay home.
- (vehemently) – She is furious!

Measuring Sentiment - Intensity

- » Intensity is about the **degree of emotion**, something a person can pick up pretty quick face-to-face but makes communication by text trickier – hence emoticons. 😊 😞 😐
- » Algorithm has to look for clues, for e.g.:
 - More adjectives might mean more opinion
 - Lots of nouns and verbs suggests objectivity
 - Exclamation points are sometimes useful

Challenges Faced

Challenges in Sentiment Analysis

» Sentiment at Different Text Granularities

- Unigram vs phrases? Sinful or Sinful cake?
- While sentiment lexicons are often useful in sentence-level sentiment analysis, the same terms may convey different sentiments in different contexts.
- Sentiment of a phrase or a sentence is often not simply the sum of the sentiments of its constituents.

Challenges in Sentiment Analysis

» Detecting Sentiment of the Writer, Reader, and Other Entities

James: The pop star suffered a fatal overdose of heroine.

- The sentence describes a negative event (death of a person), but it is unclear whether to conclude that James (the speaker) is personally saddened by the event.
- It is possible that James is a news reader and merely communicating information about the event.

Challenges in Sentiment Analysis

» Sentiment Towards Aspects of an Entity

- A review of a product or service can express sentiment towards various aspects.
- For example, a restaurant review can speak positively about the service, but express a negative attitude towards the food.

Challenges in Sentiment Analysis

» Stance Detection

Target of interest: women have the right to abortion

Text: A foetus has rights too!

- Humans can deduce from the text that the speaker is against the proposition.
- However, this is a challenging task for computers.

Challenges in Sentiment Analysis

» Detecting Affect and Emotions

- For example in developing customer relation models, public health, military intelligence and the video games industry, where it is necessary to make distinctions between ***anger and sadness*** (both of which are negative), ***calm and excited*** (both of which are positive), and so on.

Challenges in Sentiment Analysis

» Negated Expressions

- Negation - “a grammatical category that allows the changing of the truth value of a proposition”. ~ *Morante and Sporleder (2012)*
- Negators include: not, never, doesn't, won't etc

» Degree Adverbs & Intensifiers

- Degree adverbs include: barely, moderately, slightly etc
- Intensifiers add to the emotionality. They include: too, very etc

Challenges in Sentiment Analysis

» Sentiment in Figurative Expressions

- How to detect irony and sarcasm?
- Studies show that ironic tweets are largely negative.
- Systems must be adjusted if they are to be applied to sarcastic tweets.
- Currently, there's little to no work exploring automatic sentiment detection in hyperbole, understatement, rhetorical questions, and other creative uses of language.

Challenges in Sentiment Analysis

» Human Expressions

- Every generation and/or culture use different ways to express
 - rofl, brb, afk, ttyl, etc.
 - CMI – cannot make it... OR count me in!
 - LOL – laugh out loud! OR lots of love!
 - TTFN – believe it or not, it's been around since World War 2!

Any Questions?

We have covered:

- » Introduction to Sentiment Analysis
- » How sentiment can be measured
 - Polarity and Intensity
- » Challenges of Sentiment Analysis

