

Sentiments Analysis

Draft 0.1

Sentiment Analysis

Sentiment analysis, also called opinion mining, is the field of study that analyses people's opinions, sentiments, evaluations, appraisals, attitudes, and emotions towards entities such as products, services, organizations, individuals, issues, events, topics, and their attributes.

Types of Sentiment Analysis

- **Aspect-based**—determine specifically what your customers are discussing, like product prices in online reviews, as well as the sentiments of individual customers.
- **Emotion detection**—pinpoint emotions by associating certain words with a particular sentiment.
- **Fine-grained**—analyze sentiment across polarity categories (very positive, positive, neutral, negative, or very negative) to help determine customer opinions at more granular levels.
- **Intent**—define your customers' intent so you can understand if they're purchasing or researching and if you'll need to track and target later.

Process of Sentiment Analysis

The process of sentiment analysis follows these four steps:

1. Breaking down the text into components: sentences, phrases, tokens, and parts of speech.
2. Identifying each phrase and component.
3. Assigning a sentiment score to each phrase with plus or minus points.
4. Combining scores for a final sentiment analysis.

Three Categories

Automated: A mix of statistics, NLP, and machine-learning algorithms to identify sentiments.

Rule-based: The most straightforward sentiment analysis uses dictionaries or lexicons to explore words and phrases and determine their associated sentiments. This type of approach works well with **direct and explicit opinions**. While this system is fast and easy to use, it rarely considers **how words are combined in a sequence**. Teams need to add rules for comparative opinions as this approach can't readily understand implicit opinions.

Hybrid: Combining both **rule-based and automated systems** means you can gain the **accuracy and precision you need to truly understand your customers**. This is the most powerful system as it contains the emotional information gathered from lexicons, which can be adapted over time.

Rule Based Tools

Three NLP Tools

- **Vader**
- **Flair**
- **TextBlob**
- **Custom Sentiment Analysis Models!**

VADER

VADER (**Valence Aware Dictionary and sEntiment Reasoner**) is a lexicon and rule-based sentiment analysis tool that is specifically designed to handle **social media texts**. It uses a sentiment lexicon that is trained on social media data and incorporates rules that handle sentiment intensity, negation, and punctuation.

Vader sentiment returns the probability of a given input sentence to be positive, negative, and neutral.

Flair

Flair is a text embedding library that provides **state-of-the-art** models for named entity recognition, part-of-speech tagging, and sentiment analysis. It uses a **deep learning** approach and incorporates **contextual information** to improve the accuracy of its predictions.

Flair

Flair is a powerful NLP library that allows you to apply state-of-the-art natural language processing (NLP) models to your text, such as named entity recognition (NER), sentiment analysis, part-of-speech tagging (PoS), special support for biomedical data, sense disambiguation and classification, with support for a rapidly growing number of languages.

Flair's sentiment classifier is based on a character-level LSTM neural network which takes sequences of letters and words into account when predicting. It's based on a corpus but in the meantime, it could also predict a sentiment for OOV (Out of Vocab) words including typos

TEXTBLOB

TextBlob is a Python library that provides a simple API for sentiment analysis, **part-of-speech tagging**, and noun phrase extraction. **It uses a rule-based approach and a machine learning model to analyze text data.**

TEXTBLOB returns (Polarity and Subjectivity)::

- Polarity is a float that lies between $[-1,1]$, -1 indicates negative sentiment and +1 indicates positive sentiments.
- Subjectivity is also a float that lies in the range of $[0,1]$. Subjective sentences generally refer to opinion, emotion, or judgment.

Various results sample tests shows following results

Vader

Analysis responses are quite extreme in both ends, potentially due to the way the compound scores are calculated. Vader was **made to be distinct in its answer**.

Flair

Both cases (positivity and negativity) were not nearly as extreme as Vader, possibly owing to its emphasis on context awareness, and **using the entire text** throughout its analysis.

Flair

TextBlob struggled completely to provide a significant polarity, despite the pre-processing

For Details see [here](https://aashishmehta.com/sentiment-analysis-comparison/) (https://aashishmehta.com/sentiment-analysis-comparison/)

References

1. Vader vs Flair vs TextBlob - Sentiment Analysis Comparison

<https://aashishmehta.com/sentiment-analysis-comparison/>

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3. [Use the sentiment analysis prebuilt model in Power Automate - AI Builder | Microsoft Learn](#)
4. [AI Builder documentation | Microsoft Learn](#)
5. [What Is a CDP | Microsoft Dynamics 365](#)
6. [Sentiment Analysis in Python: TextBlob vs Vader Sentiment vs Flair vs Building It From Scratch \(neptune.ai\)](#)