

# Sentiment Analysis Algorithm

RUTUL B. PANDYA, NATIONAL INSTITUTE OF TECHNOLOGY, SURAT, INDIA

[u13ec132@eced.svnit.ac.in](mailto:u13ec132@eced.svnit.ac.in)

## Abstract

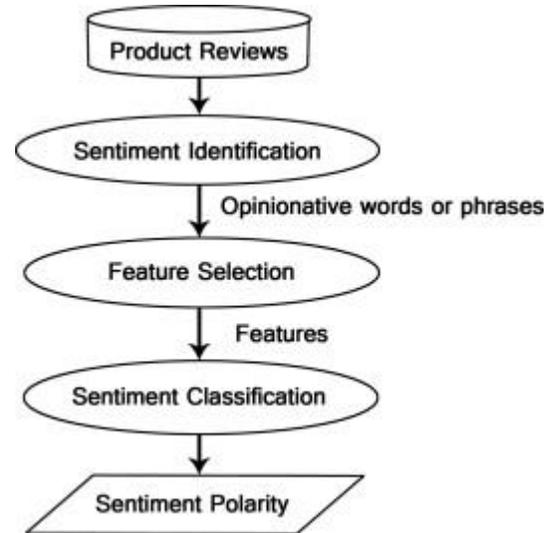
Sentimental Analysis Algorithm refers to the usage of statistics, natural language processing, and text to identify and extract the text sentiment into categories that can be termed as positive, negative, or neutral. Sentimental analysis is, therefore, the computational treatment of emotions, subjectivity of text and opinion. The present paper provides a comprehensive review of the proposed enhancement of algorithms and some sentimental analysis applications. Some of the areas investigated and presented in the article include emotion detection, transfer learning, and resource building. Sentimental analysis provides an opportunity to arrive at a decision that is binary; you are either for or against the decision. An example of such a binary question can be used on Twitter or political polls, e.g., “Do you support the use of nuclear warheads?” with the option of either answering Yes or No.

## Keywords

Social sentiments, Sentiment analysis, Opinion mining, Sentiment classification, Natural language processing

## Introduction

Sentimental analysis (SA) forms part of opinion mining where consumers are identified to give the attitudes, emotions, and opinions towards a firm’s brand, product, and service offered. Opinion mining (OM) and sentimental analysis (SA) are used interchangeably since they define a mutual meaning. OM and SA are different as OM can extract and analyze opinions people make on an entity while SA makes sentimental identification in a text and finally examines it. SA, therefore, targets to get opinions, identify expressed sentiments and then classify them by their polarity. The process is shown in the image below (Zhe, 567).



Sentimental Analysis is, therefore, a process of classification. It is divided into three primary levels: the document, sentence, and aspect levels.

Sentimental Analysis (document level) module analyzes a text piece and determines whether it has a positive or negative sentiment.

The document-level sentimental analysis supports the following languages: the UK and US English, German, Spanish, French and Italian. The module is configured in such a way that it never runs automatically during the workflow of data processing. The module, additionally, is wrapped up by the transform API that has a get sentiment

The sentimental analysis uses a single text default output with one of the following values: POSITIVE, NEGATIVE. An empty or null input returns a NULL.

Sentence-level SA classifies the sentiment expressed in each of the sentences. It establishes whether the judgment is objective or subjective in nature. Sentence level SA applies a determination of whether a sentence is positive, negative or neutral when analyzing a subjective statement. Modalities are often employed in making this

determination. Given that, sentences are just short documents; no fundamental differences exist between sentence and document level classification.

The aim of the Aspect-level SA, concerning the individual aspect of entities, is to classify the sentiment. It involves the identification of objects and their aspect. This allows providing different opinions for the same aspect.

### Use Cases of Sentimental Analysis

Sentimental analysis is applied to reviews of consumer insights. Marketing teams and customer service targets the feelings and opinions of their product's consumers. In product reviews satisfaction or dissatisfaction of a consumer can be expressed through sentimental analysis. Analysis of the impact of a new product, a campaign ad in the market can also be implemented through sentimental analysis (Pozzi, Fersini, Messina, 58).

Sentimental analysis allows customer service agent to categorize their emails depending on the urgency purely based on the email's sentiment so as to identify frustrated consumers.

The system is also applied in business intelligence to establish the reasons (subjective) why clients are responding or not responding to a product.

Other fields that applies sentimental analysis include; analysis of ideological bias in political science, gauging reactions, and trend opinions (Pozzi, Fersini, Messina, 122).

### Sentiment Analysis Challenges

Sentiment analysis can be easily misled by factors like rhetorical devices for example irony, sarcasm and at times implied meanings. The fact that people can also express opinions in the very sophisticated way makes it hard using sentiment analysis.

*Algorithmia* is a tool that gives some very powerful sentiment analysis algorithm for developers. Installing such apps is very simple in our devices given there are no settings needed for configuration or servers to set up.

Social Sentiment Analysis is the algorithm employed in updating the status for social media accounts. This algorithm when fed with a string,

gives either 'positive,' 'negative' or "neutral" returns. The algorithm can also provide a compound result; a general sentiment of the whole string (Satapathy, Suresh, Prasas, Rani, Siba, Raju, 456).

```
{  
  "sentenceList": [  
    "I like Italian cheese pizza,"  
    "I love white coffee and round donuts,"  
    "I don't want to be diagnosed with diabetes type  
A."  
  ]  
}  
{  
  "positive": 0.445,  
  "negative": 0,  
  "sentence": "I like Italian cheese pizza",  
  "neutral": 0.535,  
  "compound": 0.3512  
},  
{  
  "positive": 0.542,  
  "negative": 0,  
  "sentence": "I love white coffee and round  
donuts",  
  "neutral": 0.498,  
  "compound": 0.6399  
},
```

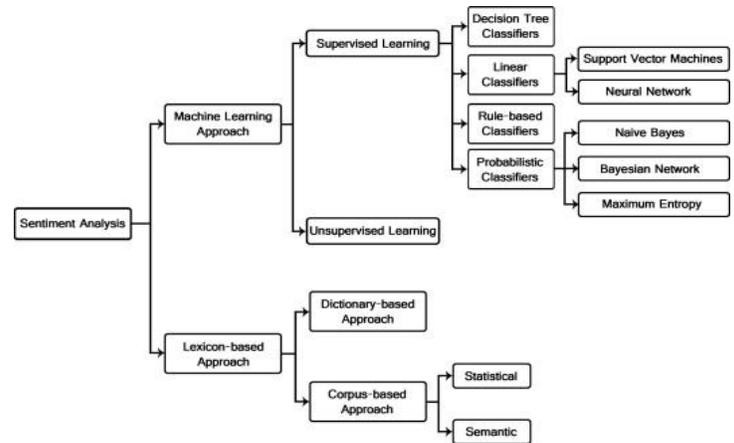
```
{
    "positive": 0,
    "negative": 0.264,
    "sentence": "I don't want to be diagnosed with
    diabetes type A",
    "neutral": 0.776,
    "compound": -0.0592
}
```

For a more general text like articles, books or transcripts, an algorithm can also feature a sentimental analysis algorithm that is flexible and can be multi-used. After taking a string input, the algorithm returns a 0 to 4 rating. With 0 representing very negative, one serving negative, 2- neutral, 3- positive and 4-very positive.

Additionally, “*Algorithmia* offers a Sentiment by Term” performing a document analysis and establishing a specific set of term’s sentiment. Such an algorithm takes in a string, consisting of the terms. It conducts the splitting of the document and average computation of each term’s sentiment done. An auto-tagging algorithm is used alongside to make the algorithm tough. Examples of auto-tagging algorithms include “Auto-Tag URL LDA and “Named Entity Recognition” algorithms. (Satapathy, Suresh, Prasas, Rani, Siba, Raju, 49).

The following pre-processing is required for sentimental analysis: noise removal, classification, named entity recognition, subjectivity classification, feature selection, and finally sentiment extraction.

The table below shows some of the steps used in Sentiment Classification Techniques used to come up with a sentiment analysis algorithm.



**Conclusion**

Conclusively, sentiment analysis algorithm involves the use of computer language in data mining processes. It requires processing of natural language text analysis and statistics to be able to extract and identify the sentiment of that particular text as positive, negative, or neutral. In other cases, it is viewed at as the computational treatment of attitudes, opinions, and subjectivity of the text.

**Works Cited**

[1] Xu, Zhe. *A Sentiment Analysis Model Integrating Multiple Algorithms and Diverse Features*. Columbus, Ohio: Ohio State University, 2010. Pozzi, Federico A, Elisabetta Fersini, and Enza Messina. *Sentiment Analysis in Social Networks*, 2016.

[2] Satapathy, Suresh C, V K. Prasad, B P. Rani, Siba K. Udgata, and K S. Raju. *Proceedings of the First International Conference on Computational Intelligence and Informatics (ICCI) 2016*, 2017.