What is Sentiment Analysis?

Sentiment analysis is the process of analyzing digital text to determine if the emotional tone of the message is positive, negative, or neutral. Today, companies have large volumes of text data like emails, customer support chat transcripts, social media comments, and reviews. Sentiment analysis tools can scan this text to automatically determine the author's attitude towards a topic. Companies use the insights from sentiment analysis to improve customer service and increase brand reputation.

Why is sentiment analysis important?

Sentiment analysis, also known as opinion mining, is an important business intelligence tool that helps companies improve their products and services. We give some benefits of sentiment analysis below.

Provide objective insights

Businesses can avoid personal bias associated with human reviewers by using artificial intelligence (AI)–based sentiment analysis tools. As a result, companies get consistent and objective results when analyzing customers' opinions.

For example, consider the following sentence:

I'm amazed by the speed of the processor but disappointed that it heats up quickly.

Marketers might dismiss the discouraging part of the review and be positively biased towards the processor's performance. However, accurate sentiment analysis tools sort and classify text to pick up emotions objectively.

Build better products and services

A sentiment analysis system helps companies improve their products and services based on genuine and specific customer feedback. AI technologies identify real-world objects or situations (called entities) that customers associate with negative sentiment. From the above example, product engineers focus on improving the processor's heat management capability because the text analysis software associated *disappointed* (*negative*) with *processor* (*entity*) and *heats up* (*entity*).

Analyze at scale

Businesses constantly mine information from a vast amount of unstructured data, such as emails, chatbot transcripts, surveys, customer relationship management records, and product feedback. Cloud-based sentiment analysis tools allow businesses to scale the process of uncovering customer emotions in textual data at an affordable cost.

Real-time results

Businesses must be quick to respond to potential crises or market trends in today's fast-changing landscape. Marketers rely on sentiment analysis software to learn what customers feel about the company's brand, products, and services in real time and take immediate actions based on their findings. They can configure the software to send alerts when negative sentiments are detected for specific keywords.

What are sentiment analysis use cases?

Businesses use sentiment analysis to derive intelligence and form actionable plans in different areas.

Improve customer service

Customer support teams use sentiment analysis tools to personalize responses based on the mood of the conversation. Matters with urgency are spotted by artificial intelligence (AI)–based chatbots with sentiment analysis capability and escalated to the support personnel.

Brand monitoring

Organizations constantly monitor mentions and chatter around their brands on social media, forums, blogs, news articles, and in other digital spaces. Sentiment analysis technologies allow the public relations team to be aware of related ongoing stories. The team can evaluate the underlying mood to address complaints or capitalize on positive trends.

Market research

A sentiment analysis system helps businesses improve their product offerings by learning what works and what doesn't. Marketers can analyze comments on online review sites, survey responses, and social media posts to gain deeper insights into specific product features. They convey the findings to the product engineers who innovate accordingly.

Track campaign performance

Marketers use sentiment analysis tools to ensure that their advertising campaign generates the expected response. They track conversations on social media platforms and ensure that the overall sentiment is encouraging. If the net sentiment falls short of expectation, marketers tweak the campaign based on real-time data analytics.

How does sentiment analysis work?

Sentiment analysis is an application of natural language processing (NLP) technologies that train computer software to understand text in ways similar to humans. The analysis typically goes through several stages before providing the final result.

Preprocessing

During the preprocessing stage, sentiment analysis identifies key words to highlight the core message of the text.

- Tokenization breaks a sentence into several elements or tokens.
- Lemmatization converts words into their root form. For example, the root form of *am* is *be*.
- Stop-word removal filters out words that don't add meaningful value to the sentence. For example, *with*, *for*, *at*, and *of* are stop words.

Keyword analysis

NLP technologies further analyze the extracted keywords and give them a sentiment score. A sentiment score is a measurement scale that indicates the emotional element in the sentiment analysis system. It provides a relative perception of the emotion expressed in text for analytical purposes. For example, researchers use 10 to represent satisfaction and 0 for disappointment when analyzing customer reviews.

What are the approaches to sentiment analysis?

There are three main approaches used by sentiment analysis software.

Rule-based

The rule-based approach identifies, classifies, and scores specific keywords based on predetermined lexicons. Lexicons are compilations of words representing the writer's intent, emotion, and mood. Marketers assign sentiment scores to positive and negative lexicons to reflect the emotional weight of different expressions. To determine if a sentence is positive, negative, or neutral, the software scans for words listed in the lexicon and sums up the sentiment score. The final score is compared against the sentiment boundaries to determine the overall emotional bearing.

Rule-based analysis example

Consider a system with words like *happy*, *affordable*, and *fast* in the positive lexicon and words like *poor*, *expensive*, and *difficult* in a negative lexicon. Marketers determine positive word scores from 5 to 10 and negative word scores from -1 to -10. Special rules are set to identify double negatives, such as *not bad*, as a positive sentiment. Marketers decide that an overall sentiment score that falls above 3 is positive, while - 3 to 3 is labeled as mixed sentiment.

Pros and cons

A rule-based sentiment analysis system is straightforward to set up, but it's hard to scale. For example, you'll need to keep expanding the lexicons when you discover new keywords for conveying intent in the text input. Also, this approach may not be accurate when processing sentences influenced by different cultures.

ML

This approach uses [machine learning (ML)](#) techniques and sentiment classification algorithms, such as [neural networks](#) and [deep learning](#), to teach computer software to identify emotional sentiment from text. This process involves creating a sentiment analysis model and training it repeatedly on known data so that it can guess the sentiment in unknown data with high accuracy.

Training

During the training, data scientists use sentiment analysis datasets that contain large numbers of examples. The ML software uses the datasets as input and trains itself to reach the predetermined conclusion. By training with a large number of diverse examples, the software differentiates and determines how different word arrangements affect the final sentiment score.

Pros and cons

ML sentiment analysis is advantageous because it processes a wide range of text information accurately. As long as the software undergoes training with sufficient examples, ML sentiment analysis can accurately predict the emotional tone of the messages. However, a trained ML model is specific to one business area. This means sentiment analysis software trained with marketing data cannot be used for social media monitoring without retraining.

Hybrid

Hybrid sentiment analysis works by combining both ML and rule-based systems. It uses features from both methods to optimize speed and accuracy when deriving contextual intent in text. However, it takes time and technical efforts to bring the two different systems together.

What are the different types of sentiment analysis?

Businesses use different types of sentiment analysis to understand how their customers feel when interacting with products or services.

Fine-grained scoring

Fine-grained sentiment analysis refers to categorizing the text intent into multiple levels of emotion. Typically, the method involves rating user sentiment on a scale of 0 to 100, with each equal segment representing very positive, positive, neutral, negative, and very negative. Ecommerce stores use a 5-star rating system as a fine-grained scoring method to gauge purchase experience.

Aspect-based

Aspect-based analysis focuses on particular aspects of a product or service. For example, laptop manufacturers survey customers on their experience with sound, graphics, keyboard, and touchpad. They use sentiment analysis tools to connect customer intent with hardware-related keywords.

Intent-based

Intent-based analysis helps understand customer sentiment when conducting market research. Marketers use opinion mining to understand the position of a specific group of customers in the purchase cycle. They run targeted campaigns on customers interested in buying after picking up words like *discounts*, *deals*, and *reviews* in monitored conversations.

Emotional detection

Emotional detection involves analyzing the psychological state of a person when they are writing the text. Emotional detection is a more complex discipline of sentiment analysis, as it goes deeper than merely sorting into categories. In this approach, sentiment analysis models attempt to interpret various emotions, such as *joy*, *anger*, *sadness*, and *regret*, through the person's choice of words.

What are the challenges in sentiment analysis?

Despite advancements in natural language processing (NLP) technologies, understanding human language is challenging for machines. They may misinterpret finer nuances of human communication such as those given below.

Sarcasm

It is extremely difficult for a computer to analyze sentiment in sentences that comprise sarcasm. Consider the following sentence, *Yeah, great. It took three weeks for my order to arrive*. Unless the computer analyzes the sentence with a complete understanding of the scenario, it will label the experience as positive based on the word *great*.

Negation

Negation is the use of negative words to convey a reversal of meaning in the sentence. For example, *I wouldn't say the subscription was expensive.* Sentiment analysis algorithms might have difficulty interpreting such sentences correctly, particularly if the negation happens across two sentences, such as, *I thought the subscription was cheap. It wasn't.*

Multipolarity

Multipolarity occurs when a sentence contains more than one sentiment. For example, a product review reads, *I'm happy with the sturdy build but not impressed with the color.* It becomes difficult for the software to interpret the underlying sentiment. You'll need to use aspect-based sentiment analysis to extract each entity and its corresponding emotion.

https://aws.amazon.com/what-is/sentiment-analysis/