Sentiment Analysis

Sentiment Analysis(Introduction)

Sentiment analysis is a technique through which you can analyze a piece of text to determine the sentiment behind it. It combines machine learning and natural language processing (NLP) to achieve this. Using basic Sentiment analysis, a program can understand if the sentiment behind a piece of text is positive, negative, or neutral.

Sentiment Analysis(Introduction)

It is a powerful technique in **Artificial intelligence** that has important business applications. For example, you can use Sentiment analysis to analyze **customer feedback**. You can collect customer feedback through various mediums **twitter, Facebook, etc.** and run sentiment analysis algorithms on them to understand your **customer 's attitude towards your product.**

What is Natural Language Processing?

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Natural language is the language you and I talk in. It could be Hindi, English, Spanish, anything. And we talk about natural language processing, we basically refer to making computers able to process this language, and more importantly understand it and take actions based on it. Now this language can be text based or audio based. Your Google Voice assistant, Siri and even google translator are great examples of this.

What is Sentiment Analysis?

Sentiment Analysis is the use of natural language processing, statistics, and text analysis to extract, and identify the sentiment of text into positive, negative, or neutral categories. We often see sentiment analysis used to arrive at a binary decision: somebody is either for or against something, users like or dislike something, or the product is good or bad.

What is Sentiment Analysis?

    Sentiment analysis is also called "opinion mining" or "Opinion extraction" or "Sentiment mining" or "Subjectivity analysis"

    Since it includes identifying consumer attitudes, emotions, and opinions of a company's product, brand, or service.

Positive   Negative   Neutral

Why do we do sentiment analysis?

Sentiment analysis is extremely useful in social media monitoring as it allows us to gain an overview of the wider public opinion behind certain topics. Social media monitoring tools like Brand watch Analytics make that process quicker and easier than ever before, thanks to real-time monitoring capabilities.

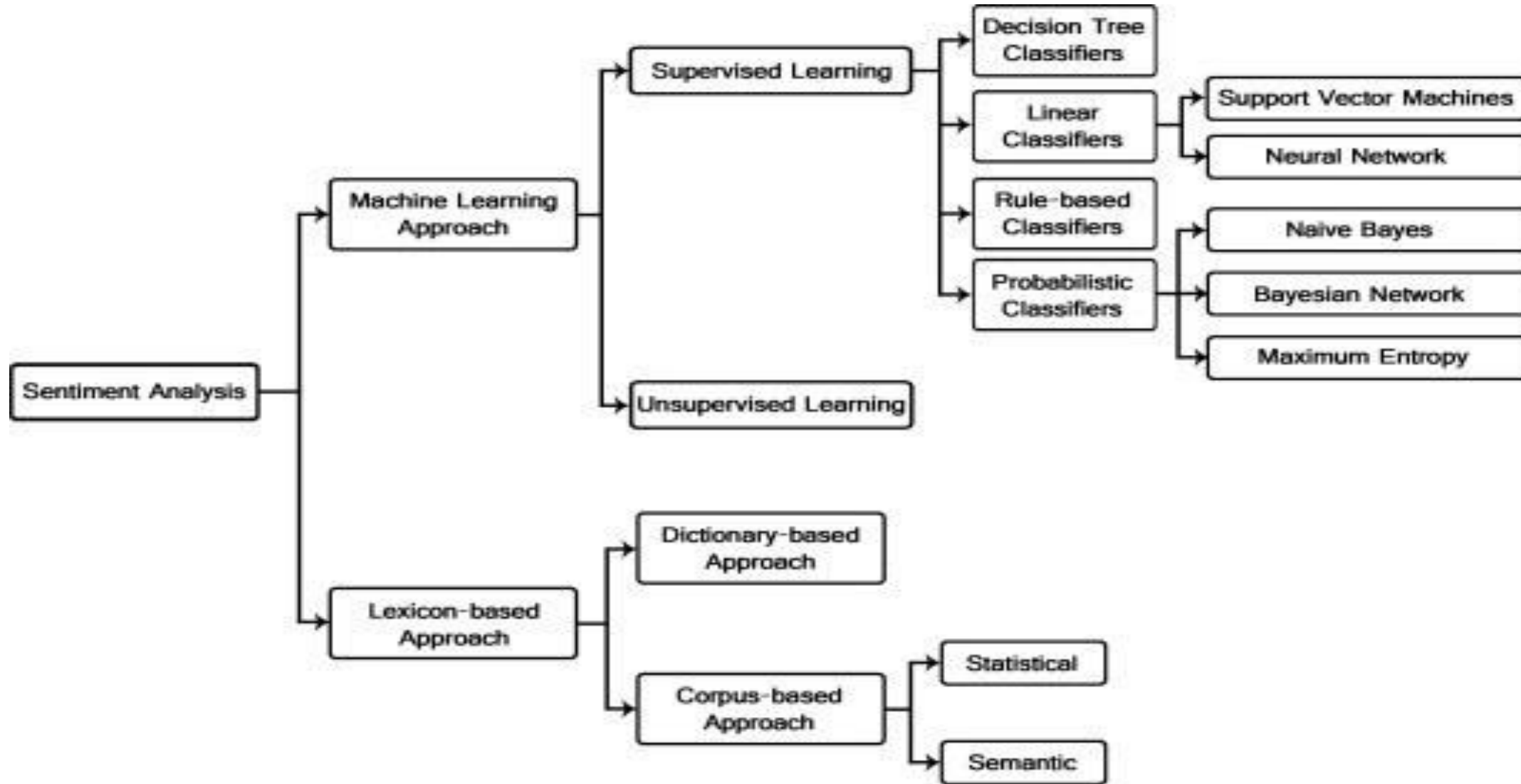Sentiment Analysis Using Supervised learning

Sentiment Analysis using unsupervised learning

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Sentiment Analysis: classifications

Types of Sentiment Analysis:

People have a wide range of emotions – sad or happy, interested or uninterested, and positive or negative. Different sentiment analysis models are available to capture this variety of emotions.

Let's look at the most important types of sentiment analysis.

1. Fine-Grained
2. Aspect-Based
3. Emotion Detection
4. Intent Analysis

Fine-Grained:

This sentiment analysis model helps you derive polarity precision. You can conduct a sentiment analysis across the following polarity categories: very positive, positive, neutral, negative, or very negative. Fine-grained sentiment analysis is helpful for the study of reviews and ratings.

Fine-Grained:

For a rating scale from 1 to 5, you can consider 1 as very negative and five as very positive. For a scale from 1 to 10, you can consider 1-2 as very negative and 9-10 as very positive.

Aspect-Based:

      While fine-grained analysis helps you determine the overall polarity of your customer reviews, aspect-based analysis delves deeper. It helps you determine the particular aspects people are talking about.

Aspect-Based:

Let's say; you're a mobile phone manufacturer, and you get a customer review stating, "the camera struggles in artificial lighting conditions."

With aspect-based analysis, you can determine that the reviewer has commented on something "negative" about the "camera."

Emotion Detection:

As the name suggests, emotion detection helps you detect emotions. This can include anger, sadness, happiness, frustration, fear, worry, panic, etc. Emotion detection systems typically use lexicons – a collection of words that convey certain emotions. Some advanced classifiers also utilize robust machine learning (ML) algorithms.

Emotion Detection:

It's recommended to use ML over lexicons because people express emotions in a myriad of ways. Take this line, for example: "This product is about to kill me." This line may express feelings of fear and panic.

A similar line – this product is killing it for me – has an entirely different and positive meaning. But the word "kill" might be associated with fear or panic in the lexicon. This may lead to inaccurate emotion detection.

Intent Analysis:

Accurately determining consumer intent can save companies time, money, and effort. So many times, businesses end up chasing consumers that don't plan to buy anytime soon. Accurate intent analysis can resolve this hurdle.

Intent Analysis:

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The intent analysis helps you identify the intent of the consumer – whether the customer intends to purchase or is just browsing around.

If the customer is willing to purchase, you can track them and target them with advertisements. If a consumer isn't ready to buy, you can save your time and resources by not advertising to them.

How to Perform Sentiment Analysis?

Modern-day sentiment analysis approaches are classified into **three categories:**

- **knowledge-based**
- **statistical**
- **hybrid**

How to Perform Sentiment Analysis?

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Here's how to perform sentiment analysis:

- **Knowledge-Based:** This approach included the classification of text based on words that emanate emotion.

- **Statistical:** This approach utilizes machine learning algorithms like latent semantic analysis and deep learning for accurate sentiment detection.

- **Hybrid:** This approach leverages both knowledge-based and statistical techniques for on-point sentiment analysis.

Sentiment analysis applications:

Businesses and organizations:

- Benchmark products and services; market intelligence.
  - Businesses spend a huge amount of money to find consumer opinions using consultants, surveys and focus groups, etc

Individuals:

- Make decisions to purchase products or to use services
- Find public opinions about political candidates and issues

Sentiment analysis applications:

Ad placement: e.g., in social media

- **Place an ad if one praises a product.**
- **Place an ad from a competitor if one criticizes a product.**

Opinion retrieval: provide general search for opinions.

Sentiment analysis uses

- **Sentiment analysis** is extremely useful in social media monitoring as it allows us to gain an overview of the wider public opinion behind certain topics. Social media monitoring tools like **Brandwatch Analytics** make that process quicker and easier than ever before, thanks to real-time monitoring capabilities.

- The applications of sentiment analysis are broad and powerful. The ability to extract insights from social data is a practice that is being widely adopted by organizations across the world.

- Shifts in sentiment on social media have been shown to correlate with shifts in the stock market.

How to Analyses Twitter Data(Example):

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Performing sentiment analysis on twitter data involves the following steps:

Gathering Twitter Data: It is very important that the downloaded twitter data is representative of what we are trying to find out. Therefore, we will extract tweets for the analysis. This kind of extraction is done with the help of different Twitter APIs. Here, we will be using GetOldTweets3(ref) to extract the data.

How to Analyses Twitter Data(Example):

Cleaning the Gathered Data: The extracted tweets might contain punctuations that have got no relevance and may not contribute to the analysis; needs to get cleaned before the analysis.

How to Analyses Twitter Data(Example):

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Analyzing the Data: Analysis of the data will give you a clearer picture of what the data(tweet) is trying to convey i.e., it will help in understanding the emotions behind the tweet. Such an analysis can also determine the opinion of the people on a particular topic, issue, or product.

Visualize the Analysis: Visualization helps in understanding the data in a simple and effective way.

Challenges of Sentiment Analysis

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People express opinions in complex ways, which makes understanding the subject of human opinions a difficult problem to solve. Rhetorical devices like sarcasm, irony, and implied meaning can mislead sentiment analysis, which is why concise and focused opinions like product, book, movie, and music reviews are easier to analyze.

Top benefits of sentiment analysis

1. Upselling opportunities
2. Agent monitoring
3. Training chatbots
4. Identifying key emotional triggers
5. Handling multiple customers
6. Adaptive customer service
7. Live insights
8. Quick escalations
9. Reduce customer churn
10. Tracking overall customer satisfaction

Conclusion:

The sentiment analysis is a huge point in our times. It now has a lot of impact for us and in the future, it will be increasing even more. You can't forget that part of building neural networks is data preparation. In the real world it is never so beautiful to get clean, prepared, and high value data. It's our job to validate a whole information, what we got and process them.

Sentiment analysis is one of the most valuable technologies in today's emotion-driven market. But it's not an easy process, and if done incorrectly, it can lead to inaccurate results. Therefore, it's crucial to work with the right company that offers sentiment analysis solutions.