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# Sentiment Analysis – Tools and Techniques

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***Abstract:***
*As we know that analysis help us to get root cause of problem. Sentiment analysis help us in various ways to improve business revenue, to improve quality of product, to understand market trend and so on. By analyzing customer feedback we can easily take decision about production and marketing. In this paper we will know about basic concepts of sentiment analysis. Process of sentiment analysis and also various tools and techniques used in sentiment analysis.*

***Keywords: Analysis, Sentiment, Sentiment Analysis, Machine Learning, Natural Language Processing***

**Introduction:**

Sentiment means feeling. Analysis means to study something in depth. Sentiment analysis is the in-depth study of emotions. In sentiment analysis, a block of text is studied to determine whether a person's opinion about something is good, bad or neutral. Of course, since this process is done through machines, machine learning comes into play here. Machine learning is part of artificial intelligence. This allows the machine to think or act like a human. There are four main types of machine learning: supervised learning, semi-supervised learning, unsupervised learning, and reinforcement learning.

**Types of Learning:**

**Supervised Learning:** As the name indicates supervised it is a type of learning which takes place under the supervision of developer or programmer. In this learning process algorithm is provided with labelled input data in order to train a machine. Machine has to observe given parameters and labels. After learning machine is provided with new unlabeled data, it has to study parameters and predict label for given new input data.

**Unsupervised learning:** it is a type of learning which takes place without any supervision on it. Here algorithm is provided with unlabelled data and it has to group objects with similar characteristics into one group. After learning algorithm is given with new data as an input and it has to predict group label for that.

**Semi-supervised learning:** It is a combination of both supervised and unsupervised learning. It uses labelled as well as unlabelled data to get trained. After Training algorithm has to predict the required output accordingly.

**Reinforcement learning:** It is a process of encouraging learning process. In reinforcement learning algorithm performs some action learns from outcomes (learning using experience) and it has to decide what action to be taken in order to generate maximum possible benefits.

**Basics of Sentiment Analysis:**

In order to perform sentiment analysis, the machine has to understand human language and interpret it and determine its nature.

Natural language processing (NLP), a subfield of artificial intelligence, gives machines the ability to understand and process human language. The human language used may be spoken or written. Language comprehension and language production are two main areas of natural language processing.

**Process involved in Sentiment Analysis:**


**Step1. Data Collection:**

For sentiment analysis it is very important to have a data set representing the sentiment. The better the quality of thwe information collected, the better it can be analyzed. We may use different methods to collect information. Social media can also be used here for example hat and how many comments the picture I uploaded got on Facebook is also an information set representing an emotion. Also, the information can be stored in a CSV file and used

**Step2. Data Processing:**

Once the information is collected, we can process it accordingly. The information collected can be in different forms such as written images, videotapes and audio. Because we have collected it from different places. Also, not all the collected information is necessarily useful for us, so after collecting the information, it is necessary to process it properly. First of all these different types or formats of information have to be converted into a single format. That is, if I want to perform sentiment analysis on written information, then the images, videos and sounds in the data set also need to be converted into written form. Then we can further process the written information. Written information is processed in the following manner

**a) Cleaning:** First of all, useless information is removed from the written information. such as numbers or special characters 1, 5, ! It shows no emotion so they are dismissed. Let's grab a comment and understand this process. "I Like Pune Very Much 1443!" comment will change to “I Like Pune Very Much” after cleaning

**b) Tokenizing:** After cleaning the information, the information is broken into small meaningful words or sentences is called tokenizing. For example the above comment we considered would look like this after tokenization [‘I’, ‘Like’, ’Pune’, ‘Very’,’Much’]

**c) Part-of-Speech Tagging:** In this step each word is labeled with a grammatical group based on its context like noun (n), pronoun (v), adjective (a) or adverb (r) etc.

**d) Removing Stop Words:** The words which occur in every sentence and do not have any special meaning in the sentence are called stop words. Such words are removed after the tokenizing. So that the sentence or information becomes easier to understand.

**e) Stemming:** It is a process of removing or cutting down suffixes or prefixes of a particular word in order to convert it into base word (stem). For example word hated will be converted into hate by removing its suffix.

**Step3. Data Analysis:**

In this step data generated after stemming has assigned with some score (like 0: neutal, -1:negative, 1:positive) either automatically by using algorithm or manually and then its nature is identified

depending on score. For example :[I:0, Like: 1, Pune:0, Very:1, Much: 1] score adds up to positive value so comment is positive.

**Step4. Data Visualization:**

Analyzed data can be visualized using various data visualization techniques like graph, chart, table etc. It makes data easier to understand and gives rapid overview about the data.

**Tools and Techniques for Sentiment Analysis:**

Nowadays, everyone expresses their opinion about something through some means or the other. Which shows the feelings of that person. By analyzing these feelings, we decide whether a product is good or bad. Should any changes be made to it? This can increase its quality. There are many tools available in the market for sentiment analysis, some of them are as follows:

**a) Monkey learn:** This is an online tool. Which can be used for sentiment analysis. In this we can upload the information in the form of a .csv file or integrate it directly from Zapier. We can tag our data by selecting the classifier text analysis model in this tool. We can do sentiment analysis using tags generated by monkey learn.

**b) Social Searcher:** This tool monitors hash tag, keywords and usernames on all social media. The free versions of these provide us with sentiment analysis tools. Which contains sentiments on all social media. They can be used to determine whether a post is positive or negative.

**c) Meaning Cloud:** This tool is used for multi-lingual sentiment analysis. It uses aspect based sentiment analysis to determine whether a topic is presented in a positive, negative or neutral manner. Its feature is that this tool can detect global sentiment.

**d) Social Mention:** It is a free sentiment analysis tool. It is also easy to use. In this user can search a keyword and get complete information about it. This analysis also shows how many positive views, how many negative views or how many neutral views there are about that keyword.

**Applications:**

**a) Social Media Monitoring:** Individuals express their honest opinions on social media. As a marketer we can analyze the sentiment expressed about our product on social media to know what people actually think about our product. This gives information about whether to make any changes in your product and helps to increase the sales of the product.

**b) Analyzing Market Competition:** By using sentiment analysis we can also know who our competitors are and take further steps in the business accordingly.

**c) Brand Reputation:** Users describe their experience in different ways after using a new product. Social media comments are preferably used for this. From these comments we can improve product quality and maintain brand reputation

**d) Market Research:** Sentiment analysis helps us understand customer preferences. They also understand their opinion and expectations about our product. It helps us in the decision making process

**Conclusion:**

Sentiment analysis is the analysis of emotions. Sentiment analysis helps us in different ways. We can also progress in business by analyzing the emotions expressed in different media. There are different sentiment analysis tools available in the market. Using it, you can easily do sentiment analysis and profit from it.

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