



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## SENTIMENT ANALYSIS FOR E-COMMERCE

1Fahad Hassan, 2Mridula Prabhakar, 3Himanshu Rawat, 4Soumya Roy

1Student, 2Student, 3Student, 4Student

1Guru Gobind Singh Indraprastha University,

2Guru Gobind Singh Indraprastha University,

3Guru Gobind Singh Indraprastha University,

4Guru Gobind Singh Indraprastha University

### ABSTRACT

Nowadays, in almost every application, we get to see the use of machine learning models. These type of models are available in abundance in today's time. Even though we have so many things already available, but the problem occurs at the implementation level as we don't know how we can make the best use of a specific model. Here, we are focusing on the previously discussed point on using a particular model in a real-world.

We are taking sentiment analysis model and use the same for business perspective which is e-commerce in our case. Basically, we are developing an e-commerce website that deals with sports related items and in that, obviously we would be having customer review section. After the product purchasing, customer may leave a review and we will use that to predict the nature of the review i.e. whether a review is negative, positive or neutral. This helps the other customers to know the reviews nature without reading it. So, in that way, we can make our website interactive. This attractive functionality would bring more customers.

As we are making this website using MERN we have a package in the node named as 'sentiment' which we add in our backend and fetch the score. The same will be used in frontend for giving graphical display of the nature of the review. We are using the emoji for the indication of the interview. In this way, we can give our website a different touch as this is something which is very rare in other e-commerce websites.

## **INTRODUCTION**

Machine learning is a concept to make a machine learn or to train a machine. It is the study of computer algorithms that improve automatically through experience. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions. Machine learning involves creating a model, which is trained on some training data and then can process additional data to make predictions. Machine learning model is the output of the training process.

In this project, we have done sentimental analysis of e-commerce website using machine learning models. Sentiment analysis refers to systemically identify, extract, quantify and study affective states and subjective information. Sentiment analysis tells us about whether a piece of writing is positive, negative or neutral. Sentiment analysis is widely applied to voice of the customer materials such as reviews and feedbacks.

Sentiment analysis applies natural language processing (NLP) and machine learning models to identify and extract subjective information from text files, for instance, a reviewer's feelings, thoughts, judgements or assessments about a particular topic or event. Natural language processing (NLP) is concerned with the interactions between computers and human language, in particular how to program computers to process and analyze large amounts of natural language data. Sentiment analysis is most effective when used as a tool for voice of customer.

The primary role of machine learning models in sentimental analysis is to improve and automate the low-level text analytics functions that sentiment analysis relies on.

### **1.1 Types Of Sentiment Analysis:**

#### **Fine Grained Sentiment Analysis:**

If polarity decision is important to one's business, they might consider expanding their polarity categories to include:

Very-Positive, Positive, Neutral, Negative, Very Negative.

This is usually referred to as fine-grained sentiment analysis, and could be used to interpret 5-Star ratings in a review, for example:

Very Positive: 5 Stars

Very Negative: 1 Star

## **Emotion Detection:**

This type of emotional analysis aims to identify emotions, such as happiness, frustration, anger, sadness and more. Many sensory systems use lexicons (meaning list when words and emotions express) or complex machine learning algorithms).

## **Aspect Based Sentiment Analysis:**

Usually, when we analyze the sentiments of a text, let's say a product review, you will want to know what specific features or features people are saying in a positive, neutral, or negative way. Where feature-based emotional analysis can be helpful, for example in the text: "The efficiency of this device is very low", feature-based classification will be able to detect if the sentence expresses a negative perception of the efficiency of a particular app.

## **1.2 Types of Algorithms used:**

### **1.2.1 Support Vector Machines:**

Support Vector Machine or SVM is one of the most widely studied learning algorithms, used for segmentation and Regression problems. Mainly, however, it is used for Machine Learning Disorders.

The purpose of the SVM algorithm is to create a dynamic line or decision line that can divide n-dimensional space into sections so that we can easily place new data point in the appropriate section in the future. This boundary of good resolution is called hyperplane.

### **1.2.2. Bayesian Network:**

The Bayesian network is a possible speculation model representing a set of variables and their conditional dependencies using a directed acyclic graph.

Also called the Bayes network, the belief network, the decision network, or the Bayesian model.

Bayesian networks are possible, because these networks are built on the distribution of opportunities, and they apply the theory of opportunity to predict and detect inaccuracies.

Real-world applications have natural possibilities, and to represent the relationship between multiple events, we need a Base network. It can also be used for a variety of tasks including forecasting, inaccuracies, diagnoses, automatic understanding, consultation, time series predictions, and uncertain decisions.

### 1.2.3 Maximum Entropy Model:

The main goal of entropy is defined as modeling a set of data provided by obtaining the highest entropy to satisfy the challenges of our previous knowledge.

Similar to the systematic regression, the high-end entropy (MaxEnt) model is also a type of log-linear model. The MaxEnt model is much wider than stockpiles. It controls the distribution of multiple countries where order is classified as binary.

### 1.2.4 Neural Networks/Deep Learning:

Neural networks are a series of algorithms that mimic the functioning of the human brain that detects relationships between large amounts of data.

They are used in a variety of financial services, from forecasting and marketing research to fraud detection and risk assessment. The use of neural networks to predict the stock market price varies.

Encouraged by biological nodes in the human body, deep learning helps computers quickly see and process images and speech. Computers then “learn” what these images or sounds represent and form a vast database of future information.

## 2. Technology Used:

### 2.1 Natural Language Processing (NLP):

Natural language processing (NLP) is a sub-field of language, computer science, and artificial intelligence that affects the interaction between computers and human language, especially how you can configure computers to process and analyse large natural language data. The result is a computer that is able to "understand" the content of the text, including the nuances of the content of the language in it. Technology can accurately extract information and understand the contents of documents and classify and organize the documents themselves.

Challenges in natural language processing often include speech recognition, natural language comprehension, and natural language generation.

## 2.2 JavaScript:

JavaScript is a lightweight, interpreted programming language. It is designed for creating network-centric applications. It is complimentary to and integrated with Java. JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform.

## 2.3 Node.js:

**Node.js** is primarily used for non-blocking, event-driven servers, due to its single-threaded nature. It's used for traditional web sites and back-end API services, but was designed with real-time, push-based architectures in mind.

Node.js is a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

## Conclusion and Future Scope

Sentiment analysis is a powerful tool for businesses that are looking to measure attitudes, feelings and emotions regarding their brand. Sentiment analysis has been an important tool for brands looking to learn more about how their customers are thinking and feeling. It is a relatively simplistic form of analytics that helps brands. It is also very effective in predicting the election results, stock market or movie reviews. To date, the majority of sentiment analysis projects have been conducted almost exclusively by companies and brands through the use of social media data, survey responses and other hubs of user-generated content. By investigating and analyzing customer sentiments, these brands are able to get an inside look at consumer behaviors and, ultimately, better serve their audiences with the products, services and experiences they offer. find key areas of weakness (negative sentiments) and strengths (positive sentiments).

Sentiment analysis is already evolving rapidly from a very simple (positive, negative, neutral) to more granular and deep understanding. The future of sentiment analysis is going to continue to dig deeper, far past the surface of the number of likes, comments and shares, and aim to reach, and truly understand, the significance of social media interactions and what they tell us about the consumers behind the screens. This forecast also predicts broader applications for sentiment analysis – brands will continue to leverage this tool, but so will individuals in the public eye, governments, nonprofits, education centers and many other organizations.

## References

- [1] PDF: Sentimental Analysis of general data. (Ankita Sharma & Udayan Godse) (*International Conference on Smart Sustainable Intelligent Computing and Applications under ICITETM 2020*).
- [2] PDF: Generalized approach to Sentiment Analysis of short messages in natural language processing. (E.V Polyakov, L.S Voskov, P.S Abramov, S.V Polyakov) (National Research Federation, University of Moscow).
- [3] PDF: Sentiment Analysis with deep neural networks: comparative study and performance assessment.

