

Chapter 9

A Comparative Study on Machine Learning Algorithms Used for Sentiment Analysis

Anuja Kotnala

University of Petroleum and Energy Studies, India


Dhakshinesh Anandh

University of Petroleum and Energy Studies, India

Saurabh Rawat

Graphic Era University, India

Anushree Sah

 <https://orcid.org/0000-0003-3444-5860>

University of Petroleum and Energy Studies, India

Abhirup Khanna

University of Petroleum and Energy Studies, India

ABSTRACT

Customer Relationship Management (CRM) is a set of practices that businesses use to manage customer interactions and customers' perception towards their products. The aim is to maximize profits by achieving customer satisfaction. Analyzing online reviews provides insights into customer satisfaction, which is pivotal for refining CRM strategies. The main factors of customer satisfaction include the quality of product and the service offered by it, which can be measured using sentiment analysis.

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Sentiment analysis has become remarkably popular recently because of its wide range of applications in market capturing and improving customer experiences in various industries, such as e-commerce, restaurants, and products. The main aim of this research is to identify the class of sentiment of product reviews using a range of machine-learning algorithms. A few algorithms that can be used are SVM, Naive Bayes and LDA. Using this integrated algorithm model, the sentiment of recent product reviews can be predicted.

1. INTRODUCTION

1.1 What is sentiment analysis?

Sentiment analysis is the technique of interpreting text data which is used to determine the emotional tone of the message and classify it into positive, negative, or neutral. These days businesses have huge amounts of text data in the form of feedback emails, customer support chats, social media comments, and product reviews and ratings. Sentiment analysis tools are then used to scan this text to determine a customer's attitude towards a topic. Results from sentiment analysis are then used by businesses to boost customer service, improve brand reputation, devise effective marketing strategies, and enhance customer retention. It also helps businesses identify friction points to significantly eliminate them.

1.2 Machine learning techniques covered in this paper utilized for sentiment analysis include:

Naive Bayes: It is a classification algorithm used in machine learning based on Bayes theorem.

$$P(A|B) = \frac{P(Y|B) \cdot P(Y)}{P(B)} \quad (1)$$

Advantages of Naive Bayes include:

1. Text classification: It is good at handling text data efficiently using probabilities of word occurrences (Sah et al., 2020).
2. Naive Bayes is considered as a baseline for natural language processing tasks.
3. Scalability and speed: Naive Bayes performs well when computational power and speed is to be utilized efficiently, hence making this model easy to deploy.

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