Chapter 20
Techniques and Approaches for Sentiment Analysis in Social Media

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ABSTRACT

The sentiment of a person (opinion) can be expressed through speech or writing in a specific natural language. Sentiment analysis (SA) often aims to identify the opinions of a writer or speaker on a particular topic or the general contextual polarity of a document. Sentiment analysis is widely employed in social media and reviews for a variety of purposes, such as customer service, political reviews, policymaking, marketing research, and decision-making. Machine learning (ML) approaches allow for the extraction of inferences from user interactions. Emotions are analyzed using a variety of machine learning approaches, such as deep learning (DL), supervised, semi-supervised, and unsupervised learning. In this chapter, various methodologies for sentiment classification are introduced in this most challenging area of sentiment analysis. This study gives academics a worldwide perspective on the analysis of feelings and its related domain, applications, and obstacles by providing an in-depth discussion of sentiment analysis methodologies.

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INTRODUCTION

In recent years, sentiment analysis (opinion analysis) has gained widespread acceptance among researchers, governments, businesses, and organizations, and sentiment analysis is also known as opinion mining. The web has become the main source of global knowledge due to the Internet's increasing popularity. Many individuals use numerous online resources to communicate their ideas and thoughts. Web-based social networks such as Twitter, Wikipedia, YouTube, and Facebook promote these services (Birjali et al., 2021). Using social media has altered people's lifestyles. People use online services to interact with others, share content, and seek social support. Businesses use online networks to improve system efficiency and achieve their aims. To constantly monitor public opinion and aid decision-making, we must use user-generated data and evaluate it automatically. As a result, SA has gained appeal in research groups in recent years. Sentiment Analysis (SA) involves categorizing input material (such as reviews, comments, or social posts) as positive, negative, or neutral. This analysis can be conducted at the document, sentence, or feature levels. These strategies are effective for gathering public opinion on products, services, marketing, politics, and social events. Analyzing Twitter user activity can forecast the popularity of political parties and coalitions. Sentiment analysis on Twitter messages indicates that they accurately mirror political trends. Sentiment Analysis approaches have historically been developed for text analysis. However, there has been limited effort to extract sentiments from visual content (e.g., images and videos). Significant results have been obtained via textual sentiment analysis in a variety of contexts (such as product reviews, social network posts, and political preferences) .

However, understanding the mood of a text is challenging due to language ambiguity, cultural factors, linguistic nuances, and difficulty in generalizing text analysis solutions. To classify sentiment, several processes must be completed, including collecting data, preprocessing, extracting features, classifying sentiment, and evaluating. There are several raw data sources from which the data is gathered. To find sentiment, data must be structured. The preprocessing of data can achieve this. After preprocessing, features are extracted. The next step is to categorize the sentiments based on the characteristics of the data. Categorizing sentiments can be done on three levels: aspect/feature, sentence, and document. There are currently three different techniques for sentiment analysis: hybrid approaches, machine-learning-based approaches, and lexicon-based approaches. ML techniques have been applied to text classification in numerous research (Chaturvedi et al., 2018). Despite their widespread use and impressive effectiveness, ML techniques mainly rely on manually defined features, which require a substantial amount of work from field experts. As a result, deep learning techniques have lately gained popularity because they can reduce the work required for feature definition while still achieving reasonably good performance (e.g., accuracy) .

This Chapter provides a broad foundation for creating a sentiment analysis model and does not focus on particular areas. It discusses different Sentiment analysis applications, sentiment analysis levels, techniques, and algorithms.

FUNDAMENTALS OF SENTIMENT ANALYSIS

Human language is translated into a machine-readable format via natural language processing (NLP). This approach can process and portray the attitudes underlying human-generated blogs, online comments, social media postings, and other material into patterns and structures that software can understand and