Chapter 9
Implementing Sentiment Analysis for Evaluating Stakeholder Perception and Social Impact

P. Selvakumar
https://orcid.org/0000-0002-3650-4548
Department of Science and Humanities, Nehru Institute of Technology, Coimbatore, India

S. Poorani
https://orcid.org/0000-0001-7179-431X
Kongu Engineering College, India

R. Sahith
https://orcid.org/0009-0006-8611-2602
CVR College of Engineering, India

Ganesh Pathak
https://orcid.org/0000-0003-0427-2145
Sri Balaji University, Pune, India

Nilesh Anute
https://orcid.org/0000-0001-6599-813X
Sri Balaji University, Pune, India

T. C. Manjunath
https://orcid.org/0000-0003-2545-9160
Rajarajeswari College of Engineering, India

ABSTRACT

Sentiment analysis, often referred to as opinion mining, is a powerful technique within the broader field of natural language processing (NLP) and artificial intelligence (AI), designed to determine and quantify the emotional tone behind a body of text. Its core objective is to analyze written or spoken language and classify sentiments expressed as positive, negative, or neutral. In some sophisticated implementations, sentiment analysis can also identify more nuanced emotional states such as anger, joy, sadness, surprise, trust, and disgust. This technology has seen rapid adoption across numerous industries, driven by the explosion of online content and the growing need for organizations to understand public perception. The internet has

DOI: 10.4018/979-8-3373-5142-1.ch009

enabled billions of users to share their opinions and experiences through social media platforms, product reviews, blog posts, news articles, forums, and other digital channels. Manually processing this immense volume of unstructured data is virtually impossible, which is where sentiment analysis provides invaluable support.

THE ROLE OF SENTIMENT ANALYSIS: OVERVIEW OF SENTIMENT ANALYSIS

Sentiment analysis, often referred to as opinion mining, is a powerful technique within the broader field of natural language processing (NLP) and artificial intelligence (AI), designed to determine and quantify the emotional tone behind a body of text. Its core objective is to analyze written or spoken language and classify sentiments expressed as positive, negative, or neutral. In some sophisticated implementations, sentiment analysis can also identify more nuanced emotional states such as anger, joy, sadness, surprise, trust, and disgust. This technology has seen rapid adoption across numerous industries, driven by the explosion of online content and the growing need for organizations to understand public perception. The internet has enabled billions of users to share their opinions and experiences through social media platforms, product reviews, blog posts, news articles, forums, and other digital channels. Manually processing this immense volume of unstructured data is virtually impossible, which is where sentiment analysis provides invaluable support. At a technical level, sentiment analysis involves a combination of linguistic processing, machine learning algorithms, and often deep learning models. It begins with data preprocessing, where text is cleaned and normalized—removing noise such as punctuation, stop words, and irrelevant information. Tokenization breaks down the text into manageable units such as words or phrases. Techniques such as part-of-speech tagging and syntactic parsing can be employed to understand grammatical structures and relationships between words. Once the text is prepared, sentiment classification models—trained on large datasets labeled for sentiment—predict the emotional tone. These models range from simple rule-based approaches, which rely on predefined sentiment lexicons, to complex neural networks such as recurrent neural networks (RNNs), convolutional neural networks (CNNs), and transformers like BERT (Bidirectional Encoder Representations from Transformers), which capture deep contextual relationships within the text.

The role of sentiment analysis has become increasingly prominent in sectors such as marketing, customer service, finance, healthcare, politics, and media. In marketing and brand management, companies use sentiment analysis to gauge public opinion about their products, services, and campaigns in real-time. This enables businesses to quickly identify emerging trends, respond to crises, and refine their