

Sentiment Analysis of Green Products Using Social Media Data: A Business Analytics Approach

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Abstract—This study examines consumer sentiment toward green products using social media data. With increasing environmental awareness, businesses are adopting sustainable practices and promoting eco-friendly products. Social media platforms provide a rich source of real-time consumer opinions, which can be analyzed using Natural Language Processing (NLP) techniques. This research applies sentiment analysis methods to classify consumer opinions and identify key influencing factors such as price, quality, and trust. The findings indicate that while sentiment toward green products is largely positive, concerns about pricing and authenticity significantly impact consumer perception. The study highlights the importance of data-driven decision-making in green marketing strategies.

Index Terms—Green Marketing, Sentiment Analysis, Social Media Analytics, NLP, Business Analytics.

I. INTRODUCTION

Green marketing has emerged as a critical strategy for businesses in response to increasing environmental concerns. Consumers today are more aware of sustainability issues such as climate change, pollution, and resource depletion. As a result, organizations are promoting eco-friendly products and sustainable practices.

At the same time, the rapid growth of social media platforms has transformed how consumers express their opinions. Platforms such as Twitter, Instagram, and Facebook provide vast amounts of user-generated content that reflect consumer perceptions. This data can be analyzed using sentiment analysis techniques to extract meaningful insights.

Sentiment analysis, also known as opinion mining, is a technique used to determine the emotional tone of textual data. It helps organizations understand consumer attitudes and preferences, enabling them to make informed decisions. In the context of green

marketing, sentiment analysis plays a crucial role in evaluating consumer response to sustainability initiatives.

II. LITERATURE REVIEW

Previous research highlights the growing importance of sentiment analysis in business analytics. According to Liu (2012), sentiment analysis involves the use of computational techniques to identify opinions expressed in text. Pang and Lee (2008) emphasized the role of machine learning in improving sentiment classification accuracy.

In the context of green marketing, studies indicate that consumer perception is influenced by factors such as environmental awareness, trust, and perceived value. Research also suggests that social media plays a significant role in shaping consumer attitudes toward eco-friendly products.

Recent advancements in NLP, particularly deep learning models such as BERT, have improved the accuracy of sentiment analysis. However, there is limited research integrating green marketing with advanced analytics techniques, especially in developing economies like India.

III. RESEARCH METHODOLOGY

This study adopts a quantitative approach using social media data. Data was collected from platforms such as Twitter and Instagram using keywords like “eco-friendly,” “green products,” and “sustainable living.”

The data preprocessing stage included:

- Tokenization
- Stopword removal
- Lemmatization
- Noise removal (URLs, emojis)

Sentiment analysis was performed using:

- Lexicon-based methods (TextBlob)
- Machine learning models (Naïve Bayes, SVM)

Additionally, aspect-based sentiment analysis was used to identify sentiment related to specific product features such as price, quality, and packaging.

IV. RESULTS AND DISCUSSION

The analysis revealed that approximately 65% of consumer sentiment toward green products is positive. Consumers appreciate sustainability efforts and eco-friendly packaging. However, around 15% of sentiment is negative, primarily due to high prices and lack of trust in environmental claims.

Aspect-based analysis shows:

- Quality → Positive sentiment
- Price → Negative sentiment
- Trust → Mixed sentiment

A key issue identified is greenwashing, where companies make misleading sustainability claims. This significantly affects consumer trust and leads to negative sentiment.

The findings suggest that while consumers support green products, their purchasing decisions are influenced by economic and psychological factors.

V. CONCLUSION

This study demonstrates that sentiment analysis of social media data is an effective tool for understanding consumer perceptions of green products. While overall sentiment is positive, factors such as price and trust play a critical role in shaping consumer attitudes.

Businesses can use these insights to improve their green marketing strategies by focusing on transparency, affordability, and product quality. The integration of business analytics with marketing strategies can help organizations achieve sustainable growth.

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