JDBIM
(Journal of Digital Business and Innovation Management)

Volume 4, No.2, December 2025 132-144
ISSN 2962-3898 (Online)
DOI: 10.26740/jdbim.v4i2.70633
https://ejournal.unesa.ac.id/index.php/jdbmi/index

Sentiment Analysis on Social Media Regarding the Boycott of Pro-Israel Products Using Machine Learning

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Abstract

This study aims to analyze public sentiment towards the boycott of pro-Israel products on social media using machine learning. Data was collected through crawling on Instagram tweets and comments, then processed through preprocessing stages such as cleaning, tokenizing, normalizing, stopword removal, and stemming. The analysis was carried out using four machine learning algorithms, namely Naïve Bayes, Support Vector Machine (SVM), K-Nearest Neighbor (KNN), and Decision Tree. The results showed that SVM provided the highest accuracy in sentiment classification. Positive sentiment dominated, in the form of support for the boycott movement as humanitarian solidarity for Palestine, while negative sentiment included the view that this movement was ineffective and potentially detrimental to the economy. A comparison of social media shows that Twitter, with its real-time nature, tends to present fast, emotional, and argument-based responses. In contrast, Instagram focuses more on visual content such as infographics and short videos, with more passive discussions in the comments column. This study shows that sentiment analysis on social media can be an important tool for businesses to understand public perceptions of sensitive issues, detect potential crises, and design more effective communication strategies.

Keywords: *Sentiment Analysis; Pro-Israel Product Boycott; Machine Learning; Twitter; Instagram.*

Received: 1 June 2025; Accepted: 13 July 2025; Published: December 2025
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Abstrak

Penelitian ini bertujuan untuk menganalisis sentimen publik terhadap pemboikotan produk pro-Israel di media sosial menggunakan machine learning. Data dikumpulkan melalui crawling pada tweet dan komentar Instagram, kemudian diproses melalui tahapan preprocessing seperti cleaning, tokenizing, normalize, stopword removal, dan stemming. Analisis dilakukan menggunakan empat algoritma machine learning, yaitu Naïve Bayes, Support Vector Machine (SVM),

To cite this document:
Fitriani, Nurul Aulia., Alam, Syamsu., Taufik, Muhammad. (2025). Sentiment Analysis on Social Media Regarding the Boycoot of Pro-Israel Products Using Machine Learning). *JDBIM (Journal of Digital Business and Innovation Management*, *Vol 4. No.2, December 2025, pp 132-144, 10.26740/jdbim.v4i2.70633.*

K-Nearest Neighbor (KNN), dan Decision Tree. Hasil penelitian menunjukkan bahwa SVM memberikan akurasi tertinggi dalam klasifikasi sentimen. Sentimen positif berupa dukungan terhadap gerakan boikot sebagai solidaritas kemanusiaan terhadap Palestina, sedangkan sentimen negatif mencakup pandangan bahwa gerakan ini tidak efektif dan berpotensi merugikan perekonomian. Perbandingan media sosial menunjukkan bahwa Twitter, dengan sifatnya yang real-time, cenderung menghadirkan respons cepat, emosional, dan berbasis argumen. Sebaliknya, Instagram lebih berfokus pada konten visual seperti infografis dan video pendek, dengan diskusi yang lebih pasif di kolom komentar. Penelitian ini menunjukkan bahwa analisis sentimen di media sosial dapat menjadi alat penting bagi bisnis untuk memahami persepsi masyarakat terhadap isu sensitif, mendeteksi potensi krisis, dan merancang strategi komunikasi yang lebih efektif.
Kata kunci*: Analisis Sentimen; Pemboikotan Produk Pro Israel; Machine Learning; Twitter; Instagram.*

INTRODUCTION

Palestine and Israel have been widely discussed due to the ongoing unresolved conflict between them. This prolonged tension once again came under the spotlight following an Israeli attack on Palestine at the end of 2023. This occurred in early October 2023 when Israel was attacked by the Hamas group in the southern area of the Gaza Strip. The attack was Hamas's retaliation for the numerous assaults and pressures that Israel had exerted on Palestine for years (Trisnawati, 2024).

Palestinians have suffered physically, emotionally, and economically. Israel has imposed various forms of pressure on Palestinians in the Gaza Strip, including blocking international aid, providing uninhabitable living conditions, and cutting off access to electricity and water (Ardhi, 2023).

The attacks and violence perpetrated by Israel have caused tens of thousands of deaths among residents in the West Bank of Palestine. This situation can no longer be described merely as a war conflict, but rather as genocide. In early March, Israel continued its assaults despite increasing calls for a ceasefire. This situation continues to reveal severe humanitarian impacts. According to the Palestinian Ministry of Health, as of early March 2024, the death toll in Gaza had exceeded 30,000 people (Knell, 2024).

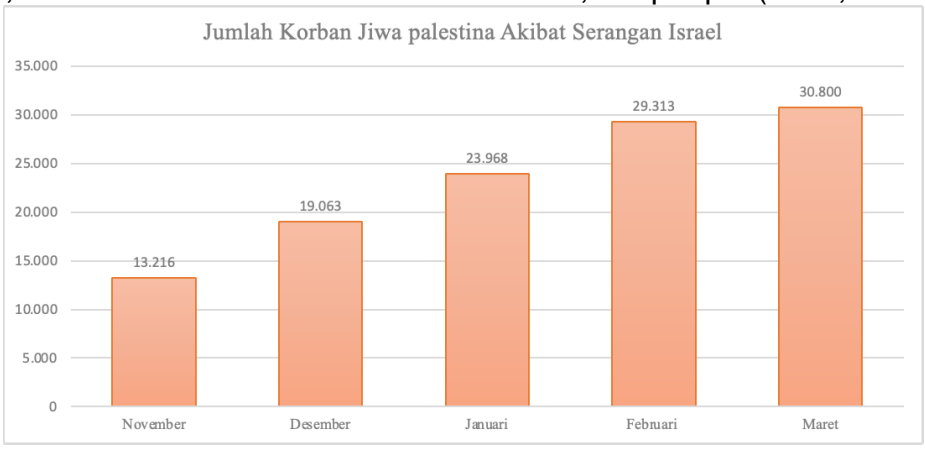

Figure 1. Palestinian Casualties Due to Israeli Attacks in 2023–2024
Source: Palestinian Central Bureau of Statistics

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E-ISSN 2692-3898
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According to data from the Palestinian Central Bureau of Statistics (PCBS) in early March 2024, a total of 32,782 people were reported dead. The data shown in Figure 1 indicates that the number of casualties more than doubled since November 2023. According to this data, from the start of the attacks on Palestine on October 7 until November 19, 2023, the number of Palestinian casualties reached 13.2 thousand. By December 14, 2023, the number had increased to 19 thousand. Then, within two months, by March 7, 2024, the death toll had reached 30 thousand.

Based on a boycott list published on the official EthicalConsumer website, many products that contribute funds to Israel are widely circulated in the Indonesian market. These boycotted products vary, ranging from fast food to personal care items. One of the most prominently boycotted brands by the Indonesian public is the fast food chain McDonald's. The full list of other boycotted products can be seen in Figure 2.

Makanan Siap Saji	Makanan Ringan	Minuman	Sabun, Shampoo dan Pasta Gigi
1. McDonald's	1. KitKat	1. Buavita	1. Rinso
2. Subway	2. Magnum	2. Sariwangi	2. Molto
3. Starbucks	3. Oreo	3. Lipton	3. Pepsodent
4. Burger King	4. Danone	4. Milo	4. Close Up
5. Pizza Hut	5. Lays	5. Nescafe	5. Sensodyne
6. KFC	6. Kraft	6. Dancow	6. Oral-B
7. Pizza Papa John's	7. Pringles	7. Coca Cola	7. Pantene
8. Domino's Pizza	8. Biskuat	8. Sprite	8. Sunsilk
9. Dunkin Donuts	9. Twix	9. Fanta	9. Lifebuoy
	10. Mars	10. Nutriboost	10. Lux
	11. Doritos	11. Minute Maid	11. Vanish
	12. Cheetos	12. Mizone	12. Johnsons
	13. Milo	13. Pepsi	13. Cif
	14. Pringles	14. Bear Brand Nestle	14. Fairy
	15. Lays	15. AQUA	15. Coolgate
	16. M&Ms	16. Pure Life Nestle	16. Listerine
	17. Cornflakes	17. Nestea	17. Heads & Shoulder

Figure 2. List of Boycotted Pro-Israel Products
Source: BDS Movement and EthicalConsumer

According to the data, McDonald's in Israel has openly expressed its support for the Israeli Defense Forces (IDF) by providing free food and beverages to Israeli soldiers. In addition, Starbucks—whose major private shareholder, Howard Schultz, is a committed Zionist—has made significant investments in the Israeli economy, including a recent $1.7 billion investment in the cybersecurity startup Wiz. Nestlé, a company widely present in Indonesia, is also one of the most affiliated with Israel. Nestlé, the Swiss multinational, operates in Israel through its investment in Osem, one of Israel's leading food producers. According to the official Boycott Israel (2024) website, this investment links Nestlé to various industries and local markets, thus expanding its involvement in the region.

Sentiment is a vital part of human moral and social behavior, related to the ability to feel and understand others' emotions. Smith (2002) states that the foundation of moral behavior is empathy—the ability to imagine

oneself in another's position. Sentiment reflects moral judgments or concepts and can be positive, negative, or neutral (Serdarevic & Tjotta, 2022), emerging from affective conditions that influence emotional responses to specific objects (Ferran, 2022). In *emotion theory*, there are three main approaches: physiological, neurological, and cognitive—each explaining how emotions are formed and influence human behavior. Opinions or views shaped by sentiment often serve as the basis for decision-making, including in the context of purchasing or rejecting a product.

Sentiment analysis, as a branch of text mining, allows computers to classify emotions and interaction patterns in text to uncover public opinion on an issue (Hudaya et al., 2019). This process helps understand and evaluate attitudes, judgments, and emotions in natural language (Fahrezi & Permana, 2022), as well as categorize opinions into positive, negative, or neutral (Fridom Mailo & Lazuardi, 2021; Ramanizar et al., 2021). This analysis is crucial in providing structured information about public perceptions of social or political environments (Mondaref Jon & Vitra Paputungan, 2023). In the context of consumption, it is closely linked to *political consumerism*—a form of political participation that transcends geographic boundaries and seeks to influence corporate policies through consumer behavior (Boulianne et al., 2022). Political consumerism includes *buycotting* and *boycotting*, with the latter being a conscious refusal to purchase certain products as a form of pressure on companies or governments (Ackermann & Gundelach, 2020).

Sentiment in economic decision-making has also been studied by Keynes (1936), who introduced the concept of animal instinct—irrational emotions that influence investor behavior and cause market volatility. Collective emotions such as fear and optimism can drive or reduce consumption and investment, which in turn affects economic growth. In the digital era, social media has become a primary channel for the public to express opinions and sentiments, including in the context of product boycotts. Social media enables users to participate, share, and create content through text, images, audio, and video, while also forming interactive communities (Thaib, 2021). These platforms provide virtual spaces that support collaboration and the exchange of ideas in various formats, both written and visual (Sugito et al., 2022), making them highly relevant mediums for analyzing public sentiment toward the issue of Israeli product boycotts.

The boycott of pro-Israel products can have significant economic impacts on the companies targeted. Sentiment analysis can help estimate these impacts by analyzing consumer responses to the boycott campaign—whether in the form of sales declines, divestments, or reputational damage. Through Twitter sentiment analysis, researchers or organizations can gain insights into how the boycott of pro-Israel products is received and understood by the wider public, as well as its potential effects on economic, political, and social dimensions. This application of sentiment analysis

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E-ISSN 2692-3898
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covers various aspects, such as opinion mining, emotional analysis, evaluation, attitudes, and assessments of products, people, organizations, services, topics, or emerging events in society. Moreover, sentiment analysis is inherently linked to the public, as the primary data source is social media, where users themselves generate content (Rusdiaman & Rosiyadi, 2019).

The boycott of pro-Israel products has sparked a wide range of opinions on social media, particularly on Twitter and Instagram, both positive and negative. This research aims to uncover public opinion and identify the impacts of this boycott. Based on the background explanation above, the researcher has chosen the thesis topic entitled: "Sentiment Analysis on Social Media Regarding the Boycott of Pro-Israel Products Using Machine Learning."
From this title, the researcher aims to obtain an accurate sentiment classification using four machine learning algorithms to distinguish between positive and negative tweets and evaluate the topic accurately.

METHODS

This research uses a quantitative approach with a descriptive method. The quantitative approach is employed to process numerical data to objectively illustrate the studied phenomenon. Meanwhile, the descriptive method is used to provide a systematic, factual, and accurate picture of Indonesian public sentiment regarding the boycott of pro-Israel products through social media data.

Instagram. Data was gathered from October 2023 to August 2024. The data used consisted of tweets about the boycott of pro-Israel products, obtained using the Snscrape library in Python, as well as Instagram comments sourced via the *Apify* platform from posts by the account @gerakanbds. The resulting datasets were stored in CSV format for further analysis.
The research stages began with a literature review to strengthen the theoretical foundation related to sentiment analysis, machine learning algorithms (Naïve Bayes, Support Vector Machine, K-Nearest Neighbor, Decision Tree), political consumerism, and the dynamics of public opinion on social media. This was followed by *data crawling* to collect tweets and comments related to the boycott topic. The collected data then underwent *preprocessing*, which included cleansing, tokenization, normalization, stopword removal, and stemming, in order to minimize noise in the dataset. Below is which presents the results of the text preprocessing stage.

Table 1. Pre-processing steps

Preprocessing Step	Result (English Translation)

Dataset	*Totally agree we must boycott products affiliated with Zionist Israel, we must support Indonesian products...*
Cleaning	*totally agree must boycott products affiliated with zionist israel must support indonesian products*
Tokenizing	*['totally', 'agree', 'must', 'boycott', 'products', 'products', 'that', 'are', 'affiliated', 'with', 'zionist', 'israel', 'we', 'must', 'support', 'products', 'indonesia']*
Normalize	*['totally', 'agree', 'must', 'boycott', 'products', 'affiliated', 'zionist', 'israel', 'must', 'support', 'products', 'indonesia']*
Stopword Removal	*['totally', 'agree', 'must', 'boycott', 'products', 'affiliated', 'zionist', 'israel', 'must', 'support', 'products', 'indonesia']*
Stemming	*agree totally must boycott product affiliate zionist israel must support product indonesia*

Source: Author's Data Processing (2024)

Sentiment labels in the dataset were assigned automatically using the TextBlob library, which classifies text into positive, neutral, or negative categories based on polarity scores. The dataset was then split into training data (80%) and test data (20%) for classification purposes. The classification was performed using four machine learning algorithms: Naïve Bayes, Support Vector Machine (SVM), K-Nearest Neighbor (KNN), and Decision Tree. Naïve Bayes was selected for its simplicity and high performance in text data, even though the assumption of word independence is not always met. SVM was applied to find the optimal hyperplane that separates sentiment categories. The KNN algorithm determines sentiment labels based on the closest distances between data points in a multi-dimensional space, while the Decision Tree algorithm builds a predictive model in the form of a tree, using attribute selection criteria such as entropy.

The performance of the four models was evaluated using a multi-class confusion matrix (positive, neutral, negative), from which accuracy, precision, recall, and F1-score metrics were calculated. This matrix includes *True Positives, True Negatives*, and various prediction errors *(False Positives* and *False Negatives)* that serve as the basis for performance evaluation. The results are presented in the form of tables, charts, and other visualizations to aid interpretation. Therefore, this research method is expected to provide a comprehensive overview of how Indonesian public opinion on the boycott of pro-Israel products is formed and distributed on social media, while also comparing the performance of the four classification methods in analyzing sentiment.

RESULTS AND DISCUSSION

This section presents the research findings related to sentiment analysis on social media regarding the boycott of pro-Israel products, obtained through data processing from Twitter and Instagram using four machine learning

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algorithms. The results include the distribution of public sentiment on both platforms, performance comparison of the algorithms, and an economic impact estimation for the companies targeted by the boycott. A detailed discussion follows to interpret these findings in the context of consumer behavior, public opinion dynamics, and strategic opportunities for local businesses in Indonesia.

Sentiment Analysis Results

This study shows that public opinion toward the boycott of pro-Israel products on social media is *generally positive*. On *Twitter, positive sentiment* dominated at 48.19%, while on Instagram, it reached 36.93%. This indicates significant support from netizens for the boycott movement, which is perceived as a form of humanitarian solidarity with Palestine.

Negative sentiment on Twitter was recorded at 22.28%, and on Instagram at 14.08%. These negative responses mostly expressed views that the boycott movement is ineffective, may cause economic harm to certain groups, or merely contributes to further polarization. Meanwhile, *neutral sentiment* accounted for 29.53% on Twitter and 48.99% on Instagram. This came from users who understood the rationale behind the boycott but chose neither to fully support nor oppose the movement. Many of them stated they lacked sufficient information to take a firm stance or were simply sharing lists of pro-Israel products without committing to any further action.

Table 2. Sentiment Labeling Results

	Positive	Neutral	Negative
Twitter	48.19%	29.53%	22.28%
Instagram	39%	46.26%	14.74%

Source: Data processed by authors (2024)

This analysis provides valuable insights for businesses in Indonesia. By monitoring social media opinions, companies can identify opportunities to market local products as alternatives, while also anticipating potential reputation crises if they are directly or indirectly affiliated with boycotted products. Understanding these sentiment dynamics also enables businesses to develop communication strategies that emphasize solidarity and sustainability, while responding to a consumer market that increasingly favors ethical values.

Machine Learning Algorithm Comparison

Table 2. Confusion Matrix Comparison for Twitter Data

Algorithm	Accuration	Precision	Recall	F1 Score
SVM	64%	69%	57%	58%
Naïve Bayes	59%	67%	50%	49%

KNN	52%	45%	45%	44%
Decision Tree	55%	52%	51%	52%

Source: Data processed by authors (2024)

Tabel 3. Confusion Matrix Comparison for Instagram Data

Algorithm	Accuration	Precision	Recall	F1 Score
SVM	77%	78%	64%	65%
Naïve Bayes	69%	56%	55%	52%
KNN	67%	62%	53%	52%
Decision Tree	67%	62%	57%	59%

Source: Data processed by authors (2024)

Comparison of Machine Learning Algorithms

This study used four machine learning algorithms to conduct sentiment analysis: Naïve Bayes, Support Vector Machine (SVM), K-Nearest Neighbor (KNN), and Decision Tree. Evaluation results showed that SVM delivered the best performance. For Twitter data, SVM achieved 64% accuracy, 69% precision, 57% recall, and an F1-score of 58%. For Instagram data, SVM reached 77% accuracy, 78% precision, 64% recall, and an F1-score of 65%.

Naïve Bayes produced an accuracy of 59% on Twitter and 69% on Instagram. Meanwhile, KNN showed lower performance, with 52% accuracy on Twitter and 67% on Instagram. The Decision Tree algorithm achieved 55% accuracy on Twitter and 67% on Instagram. These findings align with previous studies showing the superiority of SVM in sentiment analysis. Diekson et al. (2023) reported SVM accuracy at 84.5%, higher than Naïve Bayes and Logistic Regression. Ramadani et al. (2024) also found SVM outperformed Decision Tree and Logistic Regression with an accuracy of 88.18%, while Muttaqin & Kharisudin (2021) showed SVM performing better than KNN with 87.98% accuracy. These results confirm that SVM is a reliable algorithm for classifying complex textual opinions such as public sentiment on boycott issues.

Estimated Economic Impact of the Boycott

Sentiment analysis also revealed a number of international ompanies that became the main focus of social media users, including McDonald's, Starbucks, PizzaHut, Disney, Danone,and Unilever. Financial data from *finance.yahoo.com*indicated fluctuations in revenue and stock prices for these companies during the boycott period. McDonald's, for example, reported a decline in revenue from $6.41 billion in Q4 2023 to $6.17 billion in Q1 2024, with estimated losses of $240 million. Starbucks experienced a drop in revenue from $9.43 billion to $8.56 billion in the same period, with losses around $870 million. Pizza Hut Indonesia reportedly suffered nearly Rp70 billion in revenue decline from Q2 to Q3 of 2024, along with a stock price drop from Rp404 to Rp119 per share over the course of the year. These estimates suggest that the boycott

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movement can exert real economic pressure on companies perceived to be pro-Israel, although the impact varies depending on each company's market share and recovery strategy.

Comparison of Opinions on Twitter and Instagram

Discussions on Twitter tend to occur in short-form opinions, retweets, or threads using popular hashtags like #boikotprodukproisrael and #FreePalestine. The real-time nature of Twitter fosters quick, emotional responses, often leading to open debates between opposing sides and sometimes intensifying polarization. Many users also share articles, statistical data, or major media reports to strengthen their arguments, including content on the economic and social impact of the boycott movement. In contrast, Instagram discussions are more visual, dominated by infographics, posters, and short videos. Long captions are often used to provide context, but the comment sections tend to be more passive compared to Twitter. Many posts emphasize support for the boycott through narratives like "buy local" or "support ethical brands", often accompanied by personal stories of choosing alternative products. This indicates that Instagram relies more on emotional and visual approaches, while Twitter emphasizes data-driven and argumentative discourse.

CONCLUSION

Based on the findings, it can be concluded that sentiment analysis on social media related to the boycott of pro-Israel products shows a generally positive public opinion, both on Twitter and Instagram. On the Twitter dataset (total of 1,243 tweets processed), 48.19% were positive, 22.28% negative, and 29.53% neutral. Meanwhile, on the Instagram dataset (1,243 comments analyzed), 36.93% were positive, 14.08% negative, and 48.99% neutral. This indicates strong support for the boycott movement, although there are also neutral or opposing groups, often citing economic consequences. Furthermore, the comparison of machine learning algorithm performance showed that Support Vector Machine (SVM) achieved the highest accuracy compared to Naïve Bayes, K-Nearest Neighbor, and Decision Tree. SVM recorded 64% accuracy on Twitter and 77% on Instagram, along with superior precision, recall, and F1-scores. These findings reinforce previous research recommending SVM as an effective algorithm for text classification in sentiment analysis. This study also revealed differences in communication patterns between Twitter and Instagram users. Discussions on Twitter tend to be faster, more emotional, and supported by data or statistics, while Instagram interactions are more visual (infographics and posters) with relatively passive comment engagement. These insights offer valuable guidance for stakeholders seeking to understand public opinion dynamics and

present strategic opportunities for local businesses to leverage pro-boycott sentiment in developing marketing strategies that align with consumers' ethical values.

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