

Research Article

Public Sentiment Analysis Towards the Hashtag #Kaburajadulu Using A Combination of Support Vector Machine (SVM) And Random Forest Algorithm

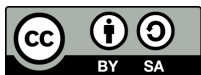
Yuma Akbar ¹, Frensis Matheos Sarimolle ², and Dwi Swasono Rachmad ³, Muhammad Derry Oktaviandi ⁴

- 1 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika (STIKOM CKI) Jakarta; Email: yumekhan@stikomcki.ac.id
 - 2 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika (STIKOM CKI) Jakarta; Email: frensis@stikomcki.ac.id
 - 3 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika (STIKOM CKI) Jakarta; Email: dwi.swasono@stikomcki.ac.id
 - 4 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika (STIKOM CKI) Jakarta; Email: yumekhan@stikomcki.ac.id
- * Corresponding Author: e-mail : yumekhan@stikomcki.ac.id

Abstract: This study aims to analyze public sentiment toward the hashtag #KaburAjaDulu, which has circulated widely on the social media platform X (formerly Twitter). The hashtag reflects the growing anxiety among the public, especially younger generations, regarding socio-political issues in Indonesia. The data were collected using web scraping techniques, focusing on user-generated tweets that contain the hashtag. A comprehensive text preprocessing phase was conducted to clean the raw data by removing irrelevant elements such as URLs, emojis, numbers, and punctuation. The research applies a hybrid classification approach using a combination of Support Vector Machine (SVM) and Random Forest algorithms to categorize sentiment into three classes: positive, negative, and neutral. The performance of the model was evaluated using metrics such as accuracy, precision, recall, and F1-score to determine the effectiveness of the classification. The study aims to demonstrate that combining algorithms can improve classification performance compared to using a single algorithm. This research contributes to the field of sentiment analysis and provides valuable insights for researchers, policymakers, and social observers in understanding public opinion trends in digital media.

Keywords: #KaburAjaDulu; Random Forest; Sentiment Analysis; Social Media Analysis; Support Vector Machine.

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1. Introduction

The rapid development of digital technology and social media has significantly transformed communication patterns in modern society. Social media platforms have become digital public spaces where individuals can express opinions, emotions, and aspirations regarding various social, economic, and political issues. Among these platforms, X (formerly Twitter) has emerged as one of the most popular microblogging services in Indonesia due to its ability to facilitate real-time discussions and information exchange. The high volume of user-generated content available on the platform provides valuable resources for understanding public opinion through sentiment analysis.

One of the recent phenomena that attracted widespread public attention is the emergence of the hashtag #KaburAjaDulu. This hashtag became viral as a form of expression among young Indonesians regarding their concerns about economic uncertainty, employment

opportunities, and socio-political conditions in the country. The hashtag reflects collective anxiety and dissatisfaction that are frequently communicated through social media. Reports from Databoks (2023) indicate that a considerable proportion of Indonesian youth express pessimism regarding future economic prospects, while national survey data also suggest increasing interest among young adults in pursuing education or employment opportunities abroad. Consequently, the hashtag represents an important digital phenomenon that can be analyzed to understand contemporary public sentiment and social perceptions.

The increasing amount of textual data generated through social media requires automated analytical approaches capable of processing information efficiently. Sentiment analysis has become one of the most widely used techniques within the fields of text mining and natural language processing (NLP) to classify opinions into positive, negative, and neutral categories. Machine learning algorithms have demonstrated strong performance in this domain, particularly Support Vector Machine (SVM), which is recognized for its ability to handle high-dimensional textual data and provide robust classification performance (Alhaq et al., 2021). Previous studies have reported successful applications of SVM in various sentiment analysis contexts, including public responses to fuel price increases, marketplace services, films, and political issues (Khairudin et al., 2023; Ramlan et al., 2023).

Several studies have confirmed the effectiveness of SVM in sentiment classification tasks. Alhaq et al. (2021) reported that SVM achieved an accuracy of 93% in classifying public opinions toward an online marketplace. Similarly, Ramlan et al. (2023) demonstrated that SVM obtained an accuracy of 82.69% when analyzing public sentiment regarding fuel price increases in Indonesia. Khairudin et al. (2023) also found that SVM achieved an accuracy of 87.5% in sentiment analysis of film-related discussions on Twitter. These findings indicate that SVM is capable of producing reliable classification results across various domains and social contexts.

Despite the growing body of literature on sentiment analysis, most previous studies have focused on products, services, entertainment, or formal policy-related issues. Research examining spontaneous and emotionally driven social phenomena remains relatively limited. Furthermore, although SVM and Random Forest have individually demonstrated strong performance in classification problems, studies investigating the combination of both algorithms in analyzing public sentiment related to viral socio-political issues are still scarce. This limitation highlights a research gap, particularly in understanding public reactions toward emerging social movements and collective expressions conveyed through social media.

Therefore, this study aims to analyze public sentiment toward the hashtag #KaburAjaDulu on the X platform by utilizing a classification approach based on Support Vector Machine (SVM) and Random Forest algorithms. The study seeks to identify sentiment distribution patterns and evaluate the effectiveness of the proposed classification model using performance metrics such as accuracy, precision, recall, and F1-score. The findings are expected to contribute to the development of machine learning-based sentiment analysis methods while providing insights into public perceptions and social dynamics in digital environments.

2. Literature Review

Sentiment Analysis

Sentiment analysis is a branch of text mining and Natural Language Processing (NLP) that aims to identify, extract, and classify opinions, attitudes, and emotions expressed in textual data into predefined categories, such as positive, negative, or neutral sentiment. With the rapid growth of social media platforms, sentiment analysis has become an important approach for understanding public opinion and behavioral trends in digital environments. The large volume of user-generated content available on social media provides valuable information that can be analyzed to reveal public perceptions toward various social, economic, and political issues.

Among social media platforms, X (formerly Twitter) has become one of the most frequently utilized data sources for sentiment analysis research. The platform allows users to express their opinions in real time, making it a valuable medium for capturing public responses to emerging events and social phenomena. Consequently, sentiment analysis on Twitter data has been widely adopted to investigate public reactions toward products, services, policies, and social issues.

Text Mining and Text Preprocessing

Text mining refers to the process of extracting meaningful information and knowledge from unstructured textual data. In sentiment analysis studies, text mining is employed to transform raw textual information into a structured format suitable for computational analysis. Since social media data often contain noise, abbreviations, hyperlinks, emojis, and other irrelevant elements, preprocessing is required to improve data quality before classification.

Text preprocessing typically involves several stages, including data cleaning, case folding, tokenization, stop-word removal, stemming, and feature extraction. One of the most commonly used feature extraction techniques is Term Frequency–Inverse Document Frequency (TF-IDF), which converts textual data into numerical representations by assigning weights to terms based on their importance within a document collection. These preprocessing steps help improve classification performance and reduce the influence of irrelevant information.

Support Vector Machine (SVM)

Support Vector Machine (SVM) is one of the most widely used supervised machine learning algorithms for text classification tasks. SVM operates by identifying an optimal hyperplane that maximizes the margin between different classes within a dataset. Its ability to handle high-dimensional feature spaces makes SVM particularly effective for sentiment analysis applications involving textual data.

Previous studies have demonstrated the effectiveness of SVM in sentiment classification. Alhaq et al. (2021) reported that SVM achieved an accuracy of 93% in classifying Twitter users' opinions regarding the Bukalapak marketplace. Similarly, Ramlan et al. (2023) obtained an accuracy of 82.69% when analyzing public sentiment toward fuel price increases in Indonesia. Furthermore, Khairudin et al. (2023) applied SVM to sentiment analysis of Indonesian movie discussions on Twitter and achieved an accuracy of 87.5%. These findings indicate that SVM consistently provides reliable performance across various sentiment analysis domains.

Random Forest

Random Forest is an ensemble learning algorithm that combines multiple decision trees to improve classification performance and prediction stability. The algorithm generates numerous decision trees during the training process and determines the final classification based on majority voting. This approach reduces the risk of overfitting and enhances model robustness when dealing with noisy or complex datasets.

In text classification problems, Random Forest has demonstrated strong predictive capabilities due to its ability to handle large feature spaces and complex relationships among variables. As a result, Random Forest is frequently employed either as a standalone classifier or in combination with other machine learning algorithms to enhance overall classification accuracy. Its complementary strengths make it a suitable candidate for integration with SVM in sentiment analysis applications.

Previous Studies and Research Gap

Numerous studies have investigated sentiment analysis using Support Vector Machine across different domains. Isnain et al. analyzed public sentiment regarding the Jakarta lockdown policy using SVM and reported an accuracy of 74%. Ramlan et al. (2023) examined public reactions to fuel price increases and achieved an accuracy of 82.69%. Khairudin et al. (2023) conducted sentiment analysis on movie-related discussions on Twitter and obtained an accuracy of 87.5%. Likewise, Alhaq et al. (2021) demonstrated that SVM could achieve an accuracy of 93% in classifying opinions related to online marketplace services.

Although previous studies have confirmed the effectiveness of SVM in sentiment classification, most of them focused on products, services, entertainment, and formal policy issues. Research examining spontaneous and emotionally driven social phenomena on social media remains relatively limited. In addition, many studies rely on a single classification algorithm without exploring the potential benefits of combining multiple machine learning approaches to improve classification performance.

The hashtag #KaburAjaDulu represents a unique social phenomenon that reflects public concerns, particularly among younger generations, regarding socio-economic and political conditions in Indonesia. Despite its widespread popularity on social media, limited academic research has explored public sentiment associated with this phenomenon. Furthermore, studies investigating the combined application of Support Vector Machine (SVM) and Random Forest for sentiment classification in the context of viral socio-political discussions are still scarce.

Therefore, this study addresses these research gaps by analyzing public sentiment toward the hashtag #KaburAjaDulu on the X platform using a combination of Support Vector Machine (SVM) and Random Forest algorithms. The proposed approach is expected to improve classification performance while providing a deeper understanding of public opinion dynamics in digital social environments.

3. Materials and Method

Research Design

This study employed a quantitative approach to analyze public sentiment toward the hashtag #KaburAjaDulu on the X platform (formerly Twitter). The research utilized sentiment analysis techniques based on text mining and machine learning to classify public opinions into positive, negative, and neutral sentiment categories. The overall process consisted of data collection, text preprocessing, feature extraction, sentiment classification, and performance evaluation.

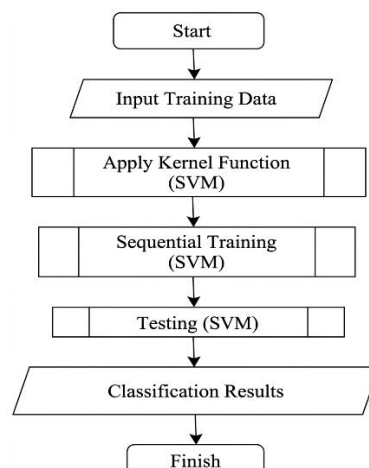


Figure 1. Research Framework of Sentiment Analysis Using SVM and Random Forest

Data Collection

The dataset was obtained from the X platform using a web scraping technique. Tweets containing the hashtag #KaburAjaDulu were collected and stored for further analysis. The collected data represented public opinions and reactions related to social, economic, and political issues associated with the hashtag.

Data Preprocessing

Before classification, the collected tweets underwent several preprocessing stages to improve data quality and eliminate irrelevant information. The preprocessing process included:

- a. Cleaning, which removed URLs, mentions, hashtags, punctuation marks, numbers, emojis, and other non-textual elements.
- b. Case Folding, which converted all characters into lowercase format.
- c. Tokenization, which separated sentences into individual words or tokens.
- d. Stopword Removal, which removed commonly occurring words that did not contribute significantly to sentiment classification.
- e. Stemming, which transformed words into their root forms.

These preprocessing steps aimed to reduce noise and improve the effectiveness of the classification model.

Feature Extraction

After preprocessing, textual data were transformed into numerical representations using the Term Frequency–Inverse Document Frequency (TF-IDF) weighting method. TF-IDF was employed to determine the importance of terms within the dataset and generate feature vectors suitable for machine learning algorithms.

Sentiment Classification

This study applied two machine learning algorithms, namely Support Vector Machine (SVM) and Random Forest, to classify sentiment into positive, negative, and neutral categories.

Support Vector Machine was utilized because of its effectiveness in handling high-dimensional text data and its ability to identify optimal decision boundaries between sentiment classes. Meanwhile, Random Forest was employed to enhance classification robustness through an ensemble learning mechanism based on multiple decision trees.

The performance of both algorithms was evaluated and compared to identify the most effective model for sentiment classification on the collected dataset.

4. Results and Discussion

Dataset Collection and Preprocessing

The dataset used in this study was obtained from the X platform (formerly Twitter) through a web scraping process using the hashtag #KaburAjaDulu as the primary keyword. This hashtag emerged as a viral social phenomenon reflecting public concerns regarding socio-economic and political conditions in Indonesia. The collected tweets represented various public opinions and perceptions, making them suitable for sentiment analysis.

Before the classification process, the collected data underwent several preprocessing stages to improve data quality and eliminate irrelevant information. The preprocessing process consisted of cleaning, case folding, tokenization, stopword removal, and stemming. Cleaning was performed to remove URLs, mentions, emojis, numbers, punctuation marks, and other non-textual elements. Subsequently, all text was converted into lowercase format through case folding. The tokenization process separated sentences into individual words, while stopword removal eliminated commonly used words that did not contribute

significantly to sentiment classification. Finally, stemming was applied to transform words into their root forms.

Table 1. Text Preprocessing Stages

Stage	Description
Cleaning	Removal of URLs, mentions, emojis, numbers, and punctuation marks
Case Folding	Conversion of all characters into lowercase format
Tokenization	Splitting text into individual words
Stopword Removal	Eliminating non-informative words
Stemming	Transforming words into their root forms
TF-IDF Weighting	Converting textual data into numerical representations

The preprocessing stages successfully transformed raw Twitter data into a structured dataset suitable for machine learning classification. By reducing noise and standardizing textual content, the quality of sentiment classification can be significantly improved.

Feature Extraction Using TF-IDF

Following preprocessing, feature extraction was conducted using the Term Frequency–Inverse Document Frequency (TF-IDF) method. TF-IDF was selected because it effectively represents textual information by assigning weights to words based on their frequency within a document and their rarity across the dataset.

The application of TF-IDF enables machine learning algorithms to identify important terms associated with specific sentiment categories. Words that frequently appear in particular sentiments receive higher weights and contribute more significantly to the classification process. Consequently, TF-IDF provides a numerical representation of textual data that facilitates more accurate sentiment prediction.

Sentiment Classification Using Support Vector Machine and Random Forest

The sentiment classification process was performed using Support Vector Machine (SVM) and Random Forest algorithms. Both algorithms were selected because they possess complementary strengths in handling textual data.

Support Vector Machine is widely recognized for its ability to classify high-dimensional data effectively. The algorithm determines an optimal hyperplane that maximizes the separation margin between sentiment classes, making it particularly suitable for sentiment analysis applications. Previous studies have demonstrated the effectiveness of SVM in classifying public sentiment on social media platforms.

Meanwhile, Random Forest employs an ensemble learning mechanism that combines multiple decision trees to produce robust classification results. This approach helps reduce overfitting and improves model stability when dealing with noisy social media data. The combination of SVM and Random Forest is expected to provide a more comprehensive evaluation of sentiment classification performance.

Sentiment Analysis of the #KaburAjaDulu Hashtag

The analysis of public sentiment toward the hashtag #KaburAjaDulu reveals that social media users actively express their opinions regarding social, economic, and political conditions through digital platforms. The emergence of this hashtag demonstrates how social media serves as a medium for collective expression and public discourse.

Based on the sentiment classification process, tweets can be categorized into positive, negative, and neutral sentiments. Positive sentiments generally reflect optimism, support, or agreement toward the ideas associated with the hashtag. Negative sentiments indicate dissatisfaction, frustration, or criticism regarding prevailing conditions. Meanwhile, neutral

sentiments typically contain informational content or opinions that do not explicitly convey emotional tendencies.

Table 2. Sentiment Categories

Sentiment	Description
Positive	Expressions of support, optimism, or agreement
Negative	Expressions of criticism, dissatisfaction, or concern
Neutral	Informative statements without strong emotional content

The distribution of sentiments provides insights into public perceptions and allows researchers to identify dominant opinion trends surrounding the hashtag. Such information can be valuable for policymakers, researchers, and social observers in understanding public concerns expressed through social media.

Performance Evaluation

The effectiveness of the classification model was evaluated using common performance metrics, including accuracy, precision, recall, and F1-score. These metrics provide a comprehensive assessment of the model's ability to correctly classify sentiment categories.

Table 3. Evaluation Metrics.

Metric	Description
Accuracy	Overall correctness of classification
Precision	Proportion of correctly predicted positive instances
Recall	Ability to identify relevant sentiment instances
F1-Score	Harmonic mean of precision and recall

The confusion matrix is used to evaluate the classification results by comparing predicted sentiment labels with actual labels. It provides detailed information regarding correctly classified and misclassified instances, thereby helping assess the strengths and weaknesses of the classification model.

Discussion

The findings of this study demonstrate the potential of machine learning techniques in analyzing public sentiment expressed through social media platforms. The use of text mining, TF-IDF feature extraction, and machine learning algorithms enables large-scale sentiment classification with minimal manual intervention.

The implementation of Support Vector Machine aligns with previous studies conducted by Alhaq et al. (2021), Ramlan et al. (2023), and Khairudin et al. (2023), which reported satisfactory classification performance across different sentiment analysis domains. Likewise, Random Forest provides an alternative classification approach that can improve robustness through ensemble learning mechanisms.

The hashtag #KaburAjaDulu represents a contemporary social phenomenon that reflects public concerns regarding socio-economic and political conditions. Therefore, sentiment analysis of this hashtag contributes not only to methodological developments in machine learning-based sentiment analysis but also to a deeper understanding of public opinion dynamics in digital environments.

6. Conclusion

This study investigated public sentiment toward the hashtag #KaburAjaDulu on the X platform (formerly Twitter) using a sentiment analysis approach based on machine learning techniques. The research implemented a systematic process consisting of data collection

through web scraping, text preprocessing, feature extraction using TF-IDF, and sentiment classification using Support Vector Machine (SVM) and Random Forest algorithms.

The findings demonstrate that sentiment analysis can be effectively utilized to identify and categorize public opinions expressed through social media platforms. The preprocessing and feature extraction stages played an important role in transforming unstructured textual data into a format suitable for machine learning classification. Furthermore, the application of SVM and Random Forest provides a robust framework for analyzing sentiment patterns and understanding public perceptions regarding contemporary social phenomena.

The hashtag #KaburAjaDulu reflects public concerns and discussions related to socio-economic and political conditions in Indonesia. Therefore, sentiment analysis of this phenomenon contributes not only to the development of machine learning-based text classification methods but also to a better understanding of digital public opinion dynamics. The study highlights the potential of social media data as a valuable source of information for researchers, policymakers, and other stakeholders seeking to monitor and evaluate public responses to emerging social issues.

Future studies are recommended to utilize larger datasets, incorporate additional machine learning and deep learning algorithms, and explore more advanced feature extraction techniques to improve classification performance and obtain deeper insights into public sentiment trends.

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