Journal of Engineering, Electrical and Informatics

E-ISSN: 2809-8706
P-ISSN: 2810-0557

Research Article

Public Sentiment Analysis on the Issue of Stopping Tax Payments on Twitter Using the Naive Bayes Method and Support Vector Machine

Mesra Betty Yel [1], Yuma Akbar [2], and Sugiyono [3], Nova Mahendra [4]

1 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika Stikom Cki Jakarta; Email: mesrabettyyel@stikomcki.ac.id
2 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika Stikom Cki Jakarta; Email: yumekhan@stikomcki.ac.id
3 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika Stikom Cki Jakarta; Email: sugiyono@stikomcki.ac.id
4 Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika Stikom Cki Jakarta; Email:
* Corresponding Author: mesrabettyyel@stikomcki.ac.id

Abstract: This research was conducted to find out public opinion on the Stop Paying Tax Issue on Twitter social media. In this study the author aims to use the Naïve Bayes Algorithm and Support Vector Machine in analyzing positive and negative sentiment labels and knowing the results of the accuracy of the Naïve Bayes algorithm and Support Vector Machine in posts by Twitter social media users related to Stop Paying Taxes. The data collection process in this study will using public data sets. The public data set is obtained from 2000 tweets. The final result of this comparison with the two test methods uses the naïve byes algorithm and Support Vector and Machine, namely the prediction results of Public Sentiment on Stop Paying Tax Issues based on data obtained from Twitter and implemented with the SVM (Support Vector Machine) method showing an accuracy value of 84.77 % Of the test data, it is predicted that 1,192 data are Negative Sentiment and 174 data are Positive Sentiment. Of the 1367 test data, 883 data were predicted as Negative Sentiment and 483 data as Positive Sentiment For the prediction results from Negative Sentiment, there were 1367 data predicted Negative and 1 data predicted Positive.

Keywords: Naïve Bayes; Sentiment Analysis; Stop Paying Taxes; Support Vector Machine; Twitter.

Received: December 15, 2021
Revised: January 10, 2022
Accepted: January 25, 2022
Published: February 16, 2022
Curr. Ver.: February 28, 2022

1. Introduction

Taxation is the largest source of government revenue and plays a crucial role in supporting national development and financing public services. The increasing contribution of tax revenue to the national budget demonstrates the importance of taxpayer compliance in sustaining economic growth and government operations. However, public trust in tax institutions may be affected by various issues related to taxation governance, which can ultimately influence taxpayers' willingness to fulfill their tax obligations.

The rapid growth of social media has transformed the way people express opinions and respond to public issues. Twitter, in particular, has become one of the most widely used platforms for sharing opinions, criticisms, and discussions regarding social, political, and

economic matters. One issue that recently attracted significant public attention in Indonesia is the Stop Paying Taxes movement, which emerged following the public disclosure of cases involving officials within the Directorate General of Taxes. The issue generated extensive discussion on Twitter and elicited diverse reactions from the public. Such discussions reflect public perceptions and sentiments that can be analyzed to better understand societal responses toward taxation-related issues.

Sentiment analysis is a text mining technique that aims to identify, classify, and interpret opinions expressed in textual data into sentiment categories such as positive and negative. The increasing volume of user-generated content on social media has encouraged researchers to employ sentiment analysis methods to extract meaningful information from public opinions. Previous studies have demonstrated the effectiveness of sentiment analysis in examining public perceptions across various domains. Fitriani et al. reported that the Naïve Bayes algorithm achieved an accuracy of 100% in sentiment analysis related to the implementation of the Government Employee Agreement Program (PPPK) for teachers [1]. Similarly, Petiwi et al. compared Naïve Bayes and Support Vector Machine (SVM) for GoFood sentiment analysis on Twitter and found that SVM produced higher classification accuracy than Naïve Bayes [2].

Furthermore, Iskandar et al. conducted sentiment analysis on gadget reviews and reported that SVM achieved an average accuracy of 96.43%, outperforming both Naïve Bayes and k-Nearest Neighbor methods [3]. Setiawan et al. also found that SVM achieved an accuracy of 85%, which was higher than the 81.20% accuracy obtained by Naïve Bayes in analyzing sentiments toward online learning during the COVID-19 pandemic [4]. Other studies have similarly demonstrated the effectiveness of Naïve Bayes and SVM in sentiment classification tasks across various social media platforms and application domains [5]–[12].

Although numerous studies have compared Naïve Bayes and SVM for sentiment analysis, limited research has specifically investigated public sentiment regarding the Stop Paying Taxes issue on Twitter. Considering the potential impact of this issue on public trust and taxpayer compliance, understanding public sentiment is essential for obtaining insights into societal perceptions toward taxation-related controversies.

Therefore, this study aims to analyze public sentiment toward the Stop Paying Taxes issue on Twitter using the Naïve Bayes and Support Vector Machine algorithms. In addition, this study compares the classification performance of both methods to determine the algorithm that provides better accuracy in classifying positive and negative sentiments. The findings are expected to provide a comprehensive overview of public opinion regarding the issue and contribute to the development of sentiment analysis research using social media data.

2. Literature Review

Sentiment Analysis

Sentiment analysis is a branch of text mining that focuses on identifying, extracting, and classifying opinions expressed in textual data. The primary objective of sentiment analysis is to determine the sentiment orientation of a text, which is generally categorized as positive, negative, or neutral. The increasing volume of user-generated content on social media platforms has made sentiment analysis an important research area for understanding public opinions regarding products, services, policies, and social issues.

In recent years, sentiment analysis has been widely applied in various domains, including business, politics, healthcare, education, and public policy. Organizations and researchers utilize sentiment analysis to obtain valuable insights from large amounts of textual data that cannot be analyzed manually in an efficient manner. Through sentiment classification, decision-makers can better understand public perceptions and identify trends associated with specific topics.

Social media platforms such as Twitter provide a rich source of opinionated text because users frequently express their thoughts, experiences, and reactions toward current events. The large volume of tweets generated daily presents an opportunity for researchers to analyze public sentiment regarding particular issues. In this study, sentiment analysis is employed to identify public opinions related to the Stop Paying Taxes issue circulating on Twitter and to classify these opinions into positive and negative sentiment categories.

Text Mining

Text mining refers to the process of extracting useful information and knowledge from unstructured textual data. Unlike structured data stored in databases, textual data often contains inconsistencies, abbreviations, symbols, and other linguistic characteristics that require preprocessing before analysis can be performed.

The text mining process generally consists of several stages, including data collection, data cleaning, preprocessing, feature extraction, and classification. These stages aim to transform raw textual information into structured representations that can be processed by machine learning algorithms. The effectiveness of a sentiment analysis model is highly influenced by the quality of the text mining process applied during data preparation.

Within the context of social media analysis, text mining enables researchers to discover patterns, trends, and relationships from large-scale textual datasets. Therefore, text mining serves as the fundamental process that supports sentiment classification and opinion mining in this research.

Twitter as a Data Source

Twitter is one of the most popular social media platforms that allows users to publish short messages known as tweets. The platform facilitates real-time communication and enables users to express opinions regarding various topics, including social, political, economic, and governmental issues. Due to its open nature and extensive user participation, Twitter has become an important source of data for sentiment analysis research.

Tweets often contain direct expressions of public opinion, making them valuable for understanding public responses to specific events or controversies. The availability of large amounts of publicly accessible data has encouraged researchers to utilize Twitter datasets in studies involving opinion mining and sentiment classification.

In this study, Twitter data related to the Stop Paying Taxes issue were collected and analyzed to identify the sentiment tendencies of users. The platform was selected because discussions regarding the issue were actively conducted by users, providing a representative source of public opinion.

Naïve Bayes Classifier

Naïve Bayes is a probabilistic classification algorithm based on Bayes' Theorem. The algorithm assumes that the features used in the classification process are independent of one another. Although this assumption is often unrealistic in real-world situations, Naïve Bayes has demonstrated strong performance in various text classification tasks due to its simplicity and computational efficiency.

One of the major advantages of Naïve Bayes is its ability to process large datasets with relatively low computational costs. The algorithm calculates the probability of a document belonging to a specific class and assigns the class with the highest probability as the classification result. This approach makes Naïve Bayes particularly suitable for sentiment analysis applications involving large amounts of textual data.

Several previous studies have reported competitive performance of Naïve Bayes in sentiment classification tasks. The algorithm has been successfully applied in analyzing opinions related to education, public services, social issues, and digital platforms. Due to these

advantages, Naïve Bayes was selected as one of the classification methods evaluated in this research.

Support Vector Machine

Support Vector Machine (SVM) is a supervised machine learning algorithm widely used for classification and pattern recognition tasks. The primary objective of SVM is to identify an optimal hyperplane that maximizes the separation between different classes within a dataset. This characteristic allows SVM to achieve high classification performance, particularly when dealing with high-dimensional data.

In text classification problems, each document is represented by a large number of features derived from textual content. SVM has proven effective in handling such high-dimensional feature spaces while maintaining good generalization capabilities. As a result, SVM has become one of the most frequently applied algorithms in sentiment analysis research.

Previous studies have shown that SVM often achieves higher classification accuracy than several conventional machine learning methods in sentiment analysis tasks. Its ability to identify optimal decision boundaries makes it suitable for distinguishing between positive and negative opinions expressed in social media texts. Therefore, SVM was selected as a comparative classification method in this study.

Related Studies

Numerous studies have investigated sentiment analysis using Naïve Bayes and Support Vector Machine algorithms. Fitriani et al. reported that Naïve Bayes achieved an accuracy of 100% in sentiment analysis concerning the implementation of the Government Employee Agreement Program (PPPK) for teachers [1]. The findings demonstrated the capability of Naïve Bayes in classifying social media opinions with high accuracy.

Petiwi et al. compared Naïve Bayes and SVM in analyzing public sentiment toward GoFood services on Twitter and found that SVM produced superior classification performance [2]. Similar findings were reported by Iskandar et al., who compared Naïve Bayes, SVM, and k-Nearest Neighbor for gadget sentiment analysis and concluded that SVM achieved the highest average accuracy [3].

Setiawan et al. applied Naïve Bayes and SVM to analyze public opinions regarding online learning during the COVID-19 pandemic and reported that SVM outperformed Naïve Bayes in terms of accuracy [4]. Other researchers also demonstrated the successful application of these algorithms in various sentiment analysis domains, including insurance services [5], hate speech detection [6], healthcare applications [7], public figure evaluations [8], COVID-19 discussions [9], university-related opinions [10], movie reviews [11], and online meeting applications [12].

Based on previous studies, both Naïve Bayes and Support Vector Machine have consistently demonstrated strong performance in sentiment classification tasks. However, research focusing specifically on public sentiment toward the Stop Paying Taxes issue remains limited. Therefore, this study seeks to contribute to the existing literature by comparing the performance of Naïve Bayes and Support Vector Machine in classifying Twitter users' sentiments regarding this issue.

3. Materials and Method

Research Design

This study employs a sentiment analysis approach to investigate public opinions regarding the Stop Paying Taxes issue on Twitter. The research compares the performance of two classification algorithms, namely Naïve Bayes and Support Vector Machine (SVM), in classifying public sentiment into positive and negative categories. The overall research process

consists of data collection, data labeling, data preprocessing, feature extraction, model development, and performance evaluation.

Data Collection

The dataset used in this study was obtained from Twitter through a public dataset collection process. The collected data consisted of 2,000 tweets related to the Stop Paying Taxes issue. These tweets represent public opinions expressed by Twitter users regarding the taxation controversy discussed on social media.

The collected tweets were subsequently prepared for further processing through a series of text mining procedures. The objective of this stage was to ensure that the dataset was suitable for sentiment classification and machine learning implementation.

Data Labeling

Before the classification process was performed, the collected tweets were manually labeled according to their sentiment orientation. Each tweet was assigned to either a positive or negative sentiment category. The labeling process served as the reference for supervised learning and enabled the classification algorithms to learn patterns associated with each sentiment class.

The labeled dataset was then utilized as training and testing data during the model development and evaluation stages.

Data Preprocessing

Data preprocessing was conducted to improve data quality and eliminate irrelevant information contained in the tweets. This stage is essential because social media texts often contain noise such as URLs, special characters, hashtags, mentions, and unnecessary symbols.

The preprocessing stage consisted of several activities, including cleaning and text normalization. During the cleaning process, duplicate records, unwanted symbols, URLs, and irrelevant textual elements were removed. Subsequently, preprocessing operations were performed to transform textual data into a more structured format suitable for machine learning analysis.

Feature Extraction

After preprocessing, the textual data were transformed into numerical representations using the Term Frequency–Inverse Document Frequency (TF-IDF) weighting method. TF-IDF was employed to calculate the importance of each term within the document collection.

The resulting feature vectors were used as input for the classification algorithms. Through TF-IDF weighting, words that frequently appear in specific documents while remaining relatively uncommon across the entire dataset receive higher importance values, thereby improving the effectiveness of sentiment classification.

Sentiment Classification

The classification process was carried out using two machine learning algorithms, namely Naïve Bayes and Support Vector Machine (SVM). Both algorithms were implemented to classify tweets into positive and negative sentiment categories.

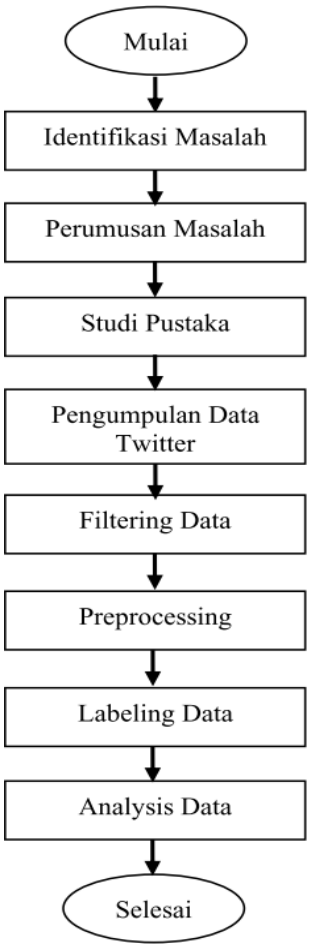
Naïve Bayes classifies documents based on probability calculations derived from Bayes' theorem, whereas SVM identifies an optimal hyperplane that separates sentiment classes with maximum margin. The use of both algorithms enables a comparative evaluation of their performance in sentiment classification.

The classification models were developed using RapidMiner as the primary analytical tool. Separate models were constructed for Naïve Bayes and SVM to ensure an objective comparison between the two algorithms.

Model Evaluation

The performance of each classification model was evaluated using accuracy measurements obtained from the testing dataset. The evaluation process aimed to determine the effectiveness of each algorithm in classifying sentiments related to the Stop Paying Taxes issue.

The classification results produced by Naïve Bayes and SVM were compared to identify the algorithm with superior performance. In addition to accuracy evaluation, the classification outcomes were analyzed to determine the distribution of positive and negative sentiments expressed by Twitter users regarding the issue under investigation.



Gambar 1. Alur Penelitian

4. Results And Discussion

Dataset Preparation and Model Development

The sentiment analysis process was conducted using Twitter data related to the Stop Paying Taxes issue. The collected tweets underwent several stages, including data labeling, cleaning, preprocessing, TF-IDF weighting, model construction, and model evaluation. The implementation process was performed using RapidMiner Studio.

During the preprocessing stage, irrelevant textual components such as unnecessary symbols, duplicate records, and non-informative terms were removed to improve data quality. Subsequently, TF-IDF weighting was applied to transform textual data into numerical representations suitable for machine learning classification. The resulting feature vectors were then utilized to construct sentiment classification models using the Naïve Bayes and Support Vector Machine algorithms.

Open in Turbo Prep Auto Model Filter (1,366 / 1,366 examples): all

Row No.	Sentimen	aan	aauliyaa	aba	abang	abat	abcdefuckye...	abdi	abis	abot
1	Positif	0	0	0	0	0	0	0	0	0
2	Positif	0	0	0	0	0	0	0	0	0
3	Positif	0	0	0	0	0	0	0	0	0
4	Positif	0	0	0	0	0	0	0	0	0
5	Positif	0	0	0	0	0	0	0	0	0
6	Positif	0	0	0	0	0	0	0	0	0
7	Positif	0	0	0	0	0	0	0	0	0
8	Positif	0	0	0	0	0	0	0	0	0
9	Positif	0	0	0	0	0	0	0	0	0
10	Positif	0	0	0	0	0	0	0	0	0
11	Positif	0	0	0	0	0	0	0	0	0
12	Positif	0	0	0	0	0	0	0	0	0
13	Positif	0	0	0	0	0	0	0	0	0
14	Positif	0	0	0	0	0	0	0	0	0
15	Positif	0	0	0	0	0	0	0	0	0
16	Positif	0	0	0	0	0	0	0	0	0
17	Positif	0	0	0	0	0	0	0	0	0

ExampleSet (1,366 examples, 1 special attribute, 4,384 regular attributes)

Figure 1. TF-IDF Weighting Results

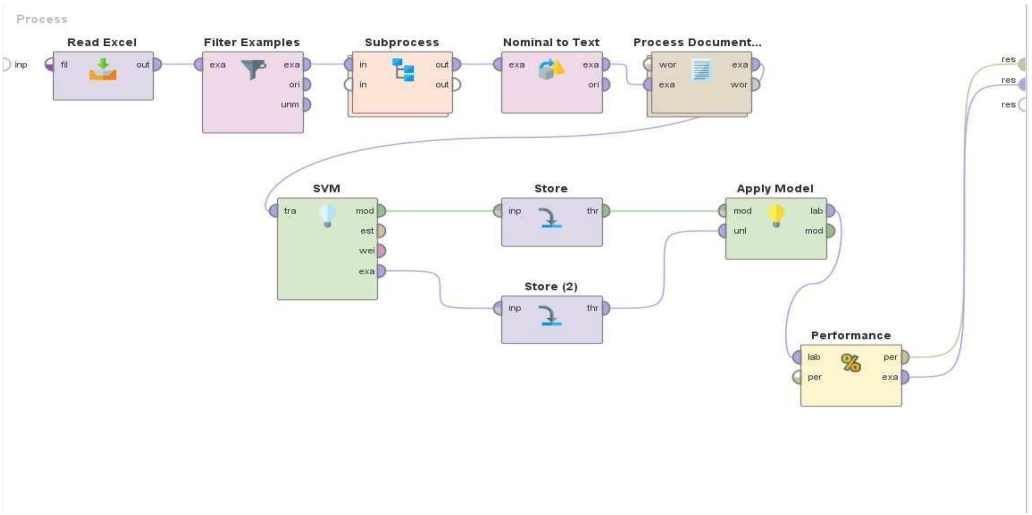


Figure 2. Support Vector Machine Model Development

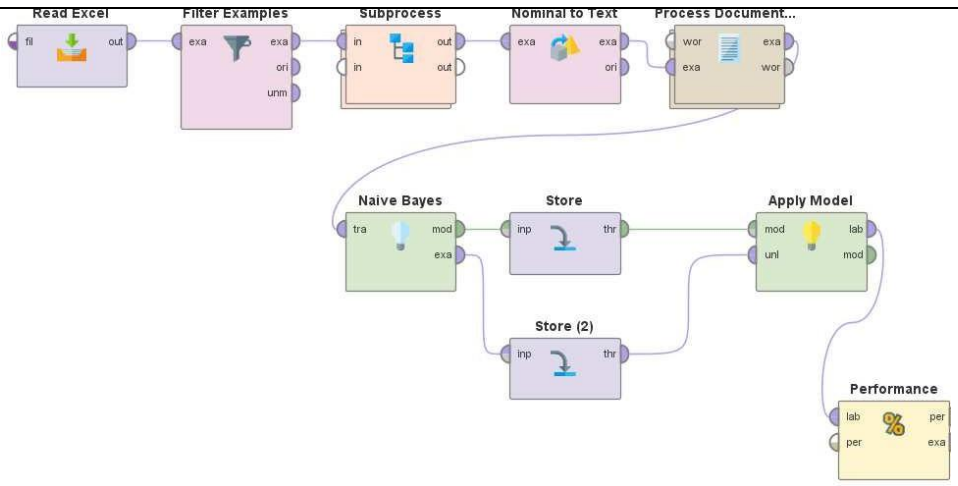


Figure 3. Naïve Bayes Model Development

Classification Performance Evaluation

The performance of both classification models was evaluated using accuracy, recall, and precision metrics. The evaluation results indicate that both algorithms successfully classified Twitter sentiments regarding the Stop Paying Taxes issue, although they exhibited different levels of performance.

Support Vector Machine Performance

The Support Vector Machine model achieved an accuracy of 84.77%. In addition, the model produced a positive recall value of 45.43% and a negative recall value of 99.50%. The precision values obtained were 97.13% for positive sentiment and 82.97% for negative sentiment. From 1,367 labeled data instances, 174 tweets were classified as positive sentiment, while 1,192 tweets were classified as negative sentiment. Furthermore, only one negative sentiment instance was incorrectly classified as positive.

PerformanceVector

```
PerformanceVector:
accuracy: 84.77%
ConfusionMatrix:
True:   Positif Negatif
Positif:        169     5
Negatif:        203     989
precision: 82.97% (positive class: Negatif)
ConfusionMatrix:
True:   Positif Negatif
Positif:        169     5
Negatif:        203     989
recall: 99.50% (positive class: Negatif)
ConfusionMatrix:
True:   Positif Negatif
Positif:        169     5
Negatif:        203     989
AUC (optimistic): 0.988 (positive class: Negatif)
AUC: 0.986 (positive class: Negatif)
AUC (pessimistic): 0.983 (positive class: Negatif)
```

Figure 4. Support Vector Machine Testing Results

Naïve Bayes Performance

The Naïve Bayes model achieved a higher accuracy of 91.87%. The model produced a positive recall of 100.00% and a negative recall of 88.30%. Precision values reached 97.13% for positive sentiment and 82.97% for negative sentiment. From 1,367 labeled data instances, 483 tweets were classified as positive sentiment and 883 tweets were classified as negative sentiment. Similar to the SVM model, only one negative sentiment instance was misclassified as positive.

PerformanceVector

```
PerformanceVector:
accuracy: 91.87%
ConfusionMatrix:
True:    Positif Negatif
Positif:         372     111
Negatif:         0       883
precision: 100.00% (positive class: Negatif)
ConfusionMatrix:
True:    Positif Negatif
Positif:         372     111
Negatif:         0       883
recall: 88.83% (positive class: Negatif)
ConfusionMatrix:
True:    Positif Negatif
Positif:         372     111
Negatif:         0       883
AUC (optimistic): 1.000 (positive class: Negatif)
AUC: 0.945 (positive class: Negatif)
AUC (pessimistic): 0.889 (positive class: Negatif)
```

Figure 5. Naïve Bayes Testing Results

Comparison of Naïve Bayes and Support Vector Machine

To determine the most effective algorithm for sentiment classification, a comparison was conducted between the two models based on their accuracy values.

Table 1. Comparison of Classification Accuracy

No	Classification Method	Accuracy (%)
1	Naïve Bayes	91.87
2	Support Vector Machine (SVM)	84.77

The comparison results indicate that the Naïve Bayes algorithm outperformed the Support Vector Machine algorithm. Naïve Bayes achieved an accuracy improvement of 7.10 percentage points compared to SVM. These findings suggest that the probabilistic approach implemented by Naïve Bayes was more suitable for the characteristics of the Twitter dataset used in this study.

The superior performance of Naïve Bayes may be attributed to its effectiveness in handling textual data represented through TF-IDF weighting. Despite the simplicity of the algorithm, Naïve Bayes demonstrated strong classification capability and achieved the highest overall accuracy among the evaluated methods.

Sentiment Analysis Results

The final sentiment analysis results revealed that public opinion regarding the Stop Paying Taxes issue was predominantly negative. Based on the classification output, 883 tweets were categorized as negative sentiment, whereas 483 tweets were categorized as positive sentiment. Additionally, only one instance of negative sentiment was incorrectly classified as positive.

Table 2. Sentiment Distribution

Sentiment Category	Number of Tweets
Positive Sentiment	483
Negative Sentiment	883
Total Classified Tweets	1,366

*The original classification output reported one additional misclassified instance.

The dominance of negative sentiment indicates that the Stop Paying Taxes issue generated substantial public concern and dissatisfaction among Twitter users. The emergence of negative opinions may be associated with declining public trust toward taxation-related institutions and controversies that became widely discussed on social media.

To facilitate interpretation, the sentiment distribution can be visualized using a pie chart and a word cloud generated from the classified tweets.

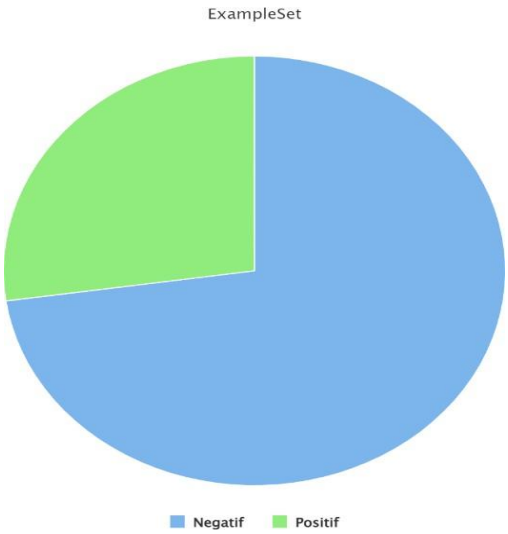


Figure 6. Sentiment Distribution Pie Chart

Overall, the findings demonstrate that sentiment analysis can effectively capture public opinion trends on social media platforms. Moreover, the comparative evaluation confirms that the Naïve Bayes algorithm provides better classification performance than Support Vector Machine for sentiment analysis related to the Stop Paying Taxes issue on Twitter.

6. Conclusion

This study analyzed public sentiment regarding the Stop Paying Taxes issue on Twitter using two machine learning classification algorithms, namely Naïve Bayes and Support Vector Machine (SVM). The sentiment analysis process was conducted through several stages, including data collection, data labeling, data cleaning, preprocessing, TF-IDF weighting, classification, and model evaluation.

The experimental results demonstrate that sentiment analysis can be effectively performed using RapidMiner Studio to process Twitter data related to the Stop Paying Taxes issue. Based on the classification results, public sentiment toward the issue was predominantly negative, indicating that the issue generated considerable concern and dissatisfaction among Twitter users.

The comparative evaluation of the classification models revealed that the Naïve Bayes algorithm achieved a higher accuracy of 91.87%, while the Support Vector Machine algorithm

obtained an accuracy of 84.77%. Furthermore, the sentiment classification results indicated that 883 tweets were categorized as negative sentiment and 483 tweets were categorized as positive sentiment. These findings suggest that Naïve Bayes provided better classification performance than SVM for the Twitter dataset used in this study.

Overall, the results confirm that both algorithms are capable of performing sentiment classification on social media data; however, Naïve Bayes demonstrated superior effectiveness in analyzing public sentiment regarding the Stop Paying Taxes issue on Twitter.

References

[1] Fitriani Fitriani, Ema Utami, and Anggit Dwi Hartanto, "Analisis Sentimen Masyarakat Terhadap Pelaksanaan P3K Guru Dengan Algoritma Naive Bayes Dan Decision Tree," Tek. Teknol. Inf. dan Multimed., vol. 3, no. 1, pp. 23–30, 2022, doi: 10.46764/teknimedia.v3i1.53.

[2] M. I. Petiwi, A. Triayudi, and I. D. Sholihati, "Analisis Sentimen Gofood Berdasarkan T Metode Naïve Bayes dan Support Vector Machine," J. Media Inform. Budidarma, vol. 6, no. 1, p. 542, 2022, doi: 10.30865/mib.v6i1.3530.

[3] J. W. Iskandar and Y. Nataliani, "Perbandingan Naïve Bayes, SVM, dan k- NN untuk Analisis Sentimen Gadget Berbasis Aspek," J. RESTI (Rekayasa Sist. dan Teknol. Informasi), vol. 5, no. 6, pp. 1120–1126, 2021, doi: 10.29207/resti.v5i6.3588.

[4] H. Setiawan, E. Utami, and S. Sudarmawan, "Analisis Sentimen Twitter Kuliah Online Pasca Covid-19 Menggunakan Algoritma Support Vector Machine dan Naive Bayes," J. Komtika (Komputasi dan Inform., vol. 5, no. 1, pp. 43–51, 2021, doi: 10.31603/komtika.v5i1.5189.

[5] L. Oktasari, Y. H. Chrisnanto, and R. Yuniarti, "Text Mining Dalam Analisis Sentimen Asuransi Menggunakan Metode Niave Bayes Classifier," Pros. SNST, vol. 7, pp. 37–42, 2016, [Online]. Available: https://www.publikasiilmiah.unwahas.ac.id/index.php/PROSIDING_SNST

_FT/article/view/1506/1589

[6] I. A. Saputri, "ANALISIS SENTIMEN HATESPEECH PADA TWITTER

DENGAN METODE NAÏVE BAYES CLASSIFIER DAN SUPPORT

VECTOR MACHINE," Rev. CENIC. Ciencias Biológicas, vol. 152, no. 3,

p. 28, 2016, [Online]. Available: file:///Users/andreataquez/Downloads/guia-plan-de-mejora-institucional.pdf%0Ahttp://salud.tabasco.gob.mx/content/revista%0Ahttp://
www.revistaalad.com/pdfs/Guias_ALAD_11_Nov_2013.pdf%0Ahttp://dx.
doi.org/10.15446/revfacmed.v66n3.60060.%0Ahttp://www.cenetec.

[7] E. Indrayuni, A. Nurhadi, and D. A. Kristiyanti, "Implementasi Algoritma

Naive Bayes, Support Vector Machine, dan K-Nearest Neighbors untuk Analisa Sentimen Aplikasi Halodoc," Fakt. Exacta, vol. 14, no. 2, p. 64, 2021, doi: 10.30998/faktorexacta.v14i2.9697.

[8] D. Rusdiaman and D. Rosiyadi, "Analisa Sentimen Terhadap Tokoh Publik Menggunakan Metode Naïve Bayes Classifier Dan Support Vector Machine," CESS (Journal Comput. Eng. Syst. Sci. , vol. 4, no. 2, pp. 230– 235, 2019.

[9] F. Sodik and I. Kharisudin, "Analisis Sentimen dengan SVM , NAIVE BAYES dan KNN untuk Studi Tanggapan Masyarakat Indonesia Terhadap Pandemi Covid-19 pada Media Sosial Twitter," Prisma, vol. 4, pp. 628–634, 2021.

[10] M. I. Fikri, T. S. Sabrila, and Y. Azhar, "Perbandingan Metode Naïve Bayes dan Support Vector Machine pada Analisis Sentimen Twitter," Smatika J., vol. 10, no. 02, pp. 71–76, 2020, doi: 10.32664/smatika.v10i02.455.

[11] E. Indrayuni, "Komparasi Algoritma Naive Bayes Dan Support Vector Machine Untuk Analisa Sentimen Review Film," J. Pilar Nusa Mandiri, vol. 14, no. 2, p. 175, 2018, doi: 10.33480/pilar.v14i2.918.

[12] N. Herlinawati, Y. Yuliani, S. Faizah, W. Gata, and S. Samudi, "Analisis Sentimen Zoom Cloud Meetings di Play Store Menggunakan Naïve Bayes dan Support Vector Machine," CESS (Journal Comput. Eng. Syst. Sci., vol. 5, no. 2, p. 293, 2020, doi: 10.24114/cess.v5i2.18186.

[13] C. F. Hasri and D. Alita, "Penerapan Metode Naïve Bayes Classifier Dan Support Vector Machine Pada Analisis Sentimen Terhadap Dampak Virus Corona Di Twitter," J. Inform. dan Rekayasa Perangkat Lunak, vol. 3, no. 2, pp. 145–160, 2022, [Online]. Available: http://jim.teknokrat.ac.id/index.php/informatika

[14] C. H. Yutika, A. Adiwijaya, and S. Al Faraby, "Analisis Sentimen Berbasis

Aspek pada Review Female Daily Menggunakan TF-IDF dan Naïve Bayes,"

J. Media Inform. Budidarma, vol. 5, no. 2, p. 422, 2021, doi: 10.30865/mib.v5i2.2845.

[15] E. Fitri, "Analisis Sentimen Terhadap Aplikasi Ruangguru Menggunakan Algoritma Naive Bayes, Random Forest Dan Support Vector Machine," J. Transform., vol. 18, no. 1, p. 71, 2020, doi: 10.26623/transformatika.v18i1.2317.

[16] R. T. Aldisa and P. Maulana, "Analisis Sentimen Opini Masyarakat Terhadap Vaksinasi Booster COVID-19 Dengan Perbandingan Metode Naive Bayes, Decision Tree dan SVM," Build. Informatics, Technol. Sci., vol. 4, no. 1, pp. 106–109, 2022, doi: 10.47065/bits.v4i1.1581.

[17] D. Ramadhan and E. B. Setiawan, "Analisis Sentimen Program Acara di SCTV pada Twitter Menggunakan Metode Naive Bayes dan Support Vector Machine," … .Telkomuniversity.Ac.Id, vol. 6, no. 2, pp. 9736–9743, 2019, [Online]. Available:

https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineerin g/article/view/10708

[18] M. Lestandy, B. Abdurrahim, and L. Syafa'ah, "Analisis Sentimen Tweet Vaksin COVID-19 Menggunakan Recurrent Neural Network dan Naïve Bayes," J. RESTI (Rekayasa Sist. dan Teknol. Informasi), vol. 5, no. 4, pp. 802–808, 2021, doi: 10.29207/resti.v5i4.3308.

[19] S. Nurul, J. Fitriyyah, N. Safriadi, E. Esyudha, and P. #3, "JEPIN (Jurnal Edukasi dan Penelitian Informatika) Analisis Sentimen Calon Presiden Indonesia 2019 dari Media Sosial Twitter Menggunakan Metode Naive Bayes," (Jurnal Edukasi dan Penelit. Inform., vol. 5, no. 3, pp. 279–285, 2019, [Online]. Available: http://dx.doi.org/10.26418/jp.v5i3.34368

[20] H. Tuhuteru and A. Iriani, "Analisis Sentimen Perusahaan Listrik Negara Cabang Ambon Menggunakan Metode Support Vector Machine dan Naive Bayes Classifier," J. Inform. J. Pengemb. IT, vol. 3, no. 3, pp. 394–401, 2018, doi: 10.30591/jpit.v3i3.977.

[21] L. B. Ilmawan and M. A. Mude, "Perbandingan Metode Klasifikasi Support Vector Machine dan Naïve Bayes untuk Analisis Sentimen pada Ulasan Tekstual di Google Play Store," Ilk. J. Ilm., vol. 12, no. 2, pp. 154–161, 2020,

doi: 10.33096/ilkom.v12i2.597.154-161.

[22] G. Testiana, Analisis Sentimen Pada Twitter Terhadap Uin Raden Fatah Menggunakan Support Vector Machine, vol. 9, no. 1. 2022. doi: 10.35957/jatisi.v9i1.1433.

[23] N. A. Budiman, S. Mulyani, and D. R. Wijayani, Perpajakan. 2019.

[24] Ibnu Akil, Buku Refrensi dan Panduan UML 2.4 Singkat Tepat Jelas. ISBN 14 -11-2018.

[25] Hammim Tohari, Buku Analisis dan Perancangan Sistem Informasi dengan Pendekatan UML ISBN: 978-979-29-4311-5, 2014.

[26] Rachmat Destriana, Buku Diagram UML Dalam Membuat Aplikasi Android Firebase ISBN: 978-623-02-3896-3, 2021.

[27] Muhammad Alkirom Wildan, Buku Manajemen Big Data Dan Data Mining. ISBN:978-623-5678-15-5, 2022.

[28] Fitri Marisa, Anastasia L. Maukar Dan Tubagus Mohammad Akhriza, Buku Data Mining Konsep Dan Penerapannya ISBN: 978-623-02-3679-2, 2021.