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Customer Review Sentiment Analysis of Alisa Batik Solo E-Commerce on TikTok Using Naive Bayes Algorithm

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ABSTRACT
This study analyzes customer sentiment toward Alisa Batik Solo's TikTok e-commerce using the Naïve Bayes algorithm. A total of 626 customer comments were collected through manual data crawling, cleaned, labeled, and processed using text preprocessing techniques including cleaning, case folding, tokenization, stopword removal, and stemming. The processed data were then transformed using TF-IDF feature weighting and classified with Naïve Bayes to determine the polarity of customer opinions. The evaluation results showed an accuracy of 90.85%, precision of 98.29% for positive sentiment, recall of 95.24%, and an F1-score of 96.72%, indicating that the model performs effectively in classifying Indonesian short-text reviews. The findings reveal that 75.6% of the comments expressed positive sentiment, while 24.4% reflected negative opinions, demonstrating a strong level of customer satisfaction and trust in Alisa Batik Solo's products and online engagement strategy. This research confirms that the integration of Naïve Bayes with TF-IDF preprocessing provides reliable results in social media sentiment analysis and can serve as a strategic tool for e-commerce businesses to enhance marketing decisions and service quality.

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Naïve Bayes; Sentiment Analysis; TikTok; TF-IDF; E-Commerce.

1. Introduction

In the contemporary business landscape, web-based information systems and e-commerce applications have transformed how commercial activities are conducted. Rather than resisting this transformation, forward-thinking enterprises adapt through continuous digital innovation to meet evolving consumer needs. The expansion of e-commerce in Indonesia has reshaped consumer purchasing behavior from traditional face-to-face transactions to fast, convenient, and technology-driven interactions. This shift is largely supported by Indonesia's vast population and archipelagic geography, enabling e-commerce platforms to bridge spatial and logistical barriers between sellers and buyers (Priyono & Sari, 2023). E-commerce, in essence, refers to any form of trade involving goods or services conducted through electronic media such as the internet and computer networks. As public awareness of online trade grows, the opportunities for e-commerce businesses to expand in Indonesia also increase, with TikTok Shop emerging as one of the most favored platforms among consumers (Fahtu Rahman *et al*., 2024). Launched in 2021, TikTok Shop integrates short-form video entertainment with real-time shopping experiences, providing users with a

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seamless, secure, and efficient marketplace supported by a robust payment and logistics system (Rosidi & Setiawan, 2024). Unlike other major platforms such as Shopee, Tokopedia, or Lazada, TikTok Shop combines social interaction and commerce, allowing direct engagement between sellers and audiences through live shopping features (Priyono & Sari, 2023; Rosidi & Setiawan, 2024).

The growing popularity of TikTok Shop has had a notable influence on Indonesia's creative economy, particularly within the fashion and batik industries, where online sales increased by approximately 30% in 2024 (Priyono & Sari, 2023; Fahtu Rahman *et al*., 2024). This trend demonstrates the necessity of analyzing consumer sentiment to understand public perception, identify purchasing motivations, and develop adaptive marketing strategies for maintaining competitiveness in the dynamic environment of socially integrated e-commerce. Sentiment analysis using machine learning algorithms, particularly Naïve Bayes, has proven effective in classifying consumer opinions and predicting behavioral trends in digital marketplaces (Permana *et al*., 2023; Muzaki, 2024; Arif, 2024; Sanjaya & Firmansyah, 2023). Therefore, this study examines customer sentiment toward Alisa Batik Solo on TikTok by applying the Naïve Bayes algorithm to identify the polarity of customer reviews and evaluate consumer perspectives toward local e-commerce fashion products.

2. Methodology

This research applies the Naïve Bayes Classifier method to analyze customer sentiment toward Alisa Batik Solo products on TikTok. The dataset was collected manually through data crawling from the official TikTok account of Alisa Batik Solo, resulting in 1,000 user comments. Each record contains two attributes, namely *sentiment* and *label*, representing positive or negative opinions, stored in Excel format for further processing (Fuad Amirullah *et al*., 2023). To ensure methodological rigor, the study followed several systematic stages, including data collection, preprocessing, labeling, feature extraction, algorithm training and testing, and model evaluation, as illustrated in Figure 1.

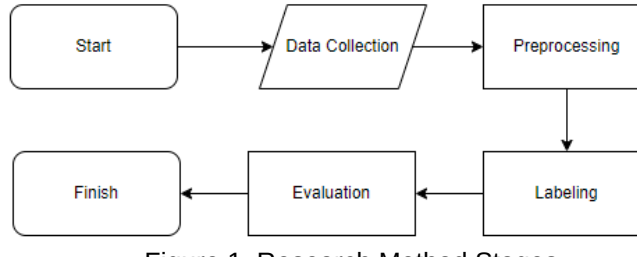

Figure 1. Research Method Stages

Illustration of the Naïve Bayes-based sentiment analysis workflow, consisting of data collection, preprocessing, labeling, feature extraction (TF-IDF), model training/testing, and evaluation.

The data collection phase involved gathering primary data through manual web scraping, focusing on customer reviews related to batik product sales. This manual approach was adopted to ensure the relevance and authenticity of textual content. All collected comments were organized, validated, and stored in structured form for subsequent analysis (Fuad Amirullah *et al*., 2023). The next step, data preprocessing, aimed to enhance data quality and prepare it for natural language processing (NLP) analysis. Several procedures were implemented, including: (1) *cleaning*, to remove

irrelevant text, hyperlinks, symbols, and emojis (Rizaludin *et al*., 2024); (2) *case folding*, converting all letters to lowercase for uniformity (Purwasih *et al*., 2024); (3) *tokenizing*, segmenting sentences into individual words for semantic clarity (Permana *et al*., 2023); (4) *stopword removal*, filtering out non-essential words such as conjunctions and particles (Kusuma & Cahyono, 2023); and (5) *stemming*, reducing words to their base forms to eliminate morphological variations (Septiansyah *et al*., 1978). After cleaning, the dataset proceeded to the labeling phase, where each comment was manually classified as either positive or negative. This labeling process formed the foundation for supervised machine learning, allowing the model to learn from annotated examples (Mhd. Fakhrozi Arif, 2024). Subsequently, feature extraction was performed using the Term Frequency–Inverse Document Frequency (TF-IDF) technique. This method transformed textual data into a numerical matrix by calculating the relative importance of words based on their frequency within a document and across all documents (Assami Muzaki, 2024). TF-IDF is widely used in sentiment analysis and has been proven to improve classification accuracy in similar studies involving e-commerce reviews (Purwasih *et al*., 2024).

The training and testing phase implemented the Naïve Bayes algorithm to categorize sentiments into positive and negative classes. Out of the total dataset, 80% was used for model training and 20% for testing. The classification results were evaluated using the confusion matrix method, which measured the relationship between predicted and actual sentiment classes (Agung Firmansyah, 2024). The algorithm's simplicity and probabilistic foundation make it suitable for text-based classification, as demonstrated in prior comparative studies showing its competitive performance against methods such as K-Nearest Neighbor (Kusuma & Cahyono, 2023; Purwasih *et al*., 2024) and Support Vector Machine (SVM) (Sanjaya & Firmansyah, 2023). Finally, the evaluation phase assessed the model's predictive performance using several key metrics, including accuracy, precision, recall, and F1-score, derived from the confusion matrix (Tania Puspa Rahayu Sanjaya & Firmansyah, 2023). Accuracy reflects the ratio of correctly classified instances to total observations, precision measures the proportion of correctly predicted positive cases, recall quantifies the model's ability to identify actual positives, and F1-score represents the harmonic mean of precision and recall. The use of multiple evaluation metrics allows for a more balanced assessment of model robustness.In addition to these measures, this study draws from the findings of Muhamad Rizaludin *et al*. (2024), who compared various data mining techniques to predict small enterprise product sales and confirmed the reliability of Naïve Bayes for structured and unstructured data. Similarly, Ikhsan Habib Kusuma and Cahyono (2023) emphasized that preprocessing and proper labeling significantly enhance the classification accuracy of sentiment models. The methodological approach adopted in this study aligns with these findings and integrates best practices from data mining, NLP, and sentiment analysis research (Firmansyah, 2024; Purwasih, 2024; Rizaludin, 2024). Through this systematic framework, the Naïve Bayes algorithm is expected to produce accurate and interpretable insights into consumer sentiment toward local batik products on social media platforms.

3. Results

The dataset used in this study was obtained through manual scraping from the official TikTok account of Alisa Batik Solo. This process involved collecting, validating, and organizing comment data related to batik product sales to ensure accuracy and relevance for sentiment analysis. Figure 2 illustrates the initial data acquisition process conducted through manual scraping.

Ulasan Pelanggan Batik
Bguss
Cantik, suka banget
Modelnya keren, bahannya bagus ga bikin gerah, motifnya bagus
Kasar ya semoga klo dah di cuci alus
Alhamdulillah pesanan sudah dtang dan sudah saya pakek hasile 5bintang kak
Ukuan pas, baju nyaman dipakai,,,lain kapan order lagi
pelayanan kurir yang sangat puas
Mantap oyy
Next order lgi brang bgus
sangat bagus
Passs
Bahannya bagus
Sesuai dengan harganya
Bagus
Keren mantap sesuai ekspektasi
Jaitan bawahnya kurang rapi
Alhamdulillah paketnya sdh sampebajunya bagus bangettt
Puas bnget pas
Baju nya keren banget.

Figure 2. Manual Scraping Results on TikTok

After data collection, a cleaning process was carried out to refine the dataset by removing unnecessary symbols, punctuation, hyperlinks, numbers, emoticons, and other irrelevant content that could interfere with text analysis. The purpose of this stage was to prepare a clean corpus suitable for linguistic processing. Table 1 presents an example of the cleaning results, showing the transformation from unprocessed to cleaned data.

Table 1. Data Cleaning Results

Before Cleaning	After Cleaning
Modelnya keren, bahannya bagus ga bikin gerah, motifnya bagus	modelnya keren bahannya bagus ga bikin gerah motifnya bagus

	A	B
1	Bagus rekomendasi sekali buat di beli kembali	
2	Cantik suka banget bajunya dan motifnya	
3	Modelnya keren bahannya bagus ga bikin gerah motifnya bagus	
4	Kasar ya semoga kalo udah di cuci halus	
5	Alhamdulillah pesanan sudah datang dan sudah saya pake hasil 5 bintang kak	
6	Ukuran pas baju nyaman dipakai lain kapan order lagi	
7	pelayanan kurir yang sangat puas	
8	Mantap banget suka sekali cantik warna warna nya	
9	Pesanan berikutnya lagi barang bagus	
10	sangat bagus motifnya juga banyak tida menyesal beli toko ini	
11	Pas cocok buat dipake kantor maupun kondangan	
12	Bahannya bagus adem sekali buat di pakai	
13	Sesuai dengan harganya yang murah meriah	
14	Bagus bajunya semoga tidak mengecewakan	
15	Keren mantap sesuai ekspektasi	
16	Jahitan bawahnya kurang rapih	
17	Alhamdulillah paketnya sudah sampe bajunya bagus banget	
18	Puas banget pas dan suka sekali sama bajunya	
19	Baju nya keren banget tidak bikin gerah	
20	Saran untuk ambil ukuran lebih besar 1x karena beneran pas ramping	

Figure 3. Data Cleaning Output

Following this stage, manual labeling was performed on 626 selected comments, classifying each into either a positive or negative sentiment category. This labeling process served as the basis for supervised learning in the Naïve Bayes classification model. Figure 4 shows a snapshot of the labeled dataset, where positive and negative sentiments were annotated.

	Komentar	Sentimen
1	bagus rekomendasi sekali buat di beli kembali	Positif
2	cantik suka banget bajunya dan motifnya	Positif
3	modelnya keren bahannya bagus ga bikin gerah motifnya bagus	Positif
4	kasar ya semoga kalo udah di cuci halus	Negatif
5	alhamdulillah pesanan sudah datang dan sudah saya pake hasil 5 bintang kak	Positif
6	ukuran pas baju nyaman dipakai lain kapan order lagi	Positif
7	pelayanan kurir yang sangat puas	Positif
8	mantap banget suka sekali cantik warna warna nya	Positif
9	pesanan berikutnya lagi barang bagus	Positif
10	sangat bagus motifnya juga banyak tidak menyesal beli toko ini	Positif
11	pas cocok buat dipake kantor maupun kondangan	Positif
12	bahannya bagus adem sekali buat di pakai	Positif
13	sesuai dengan harganya yang murah meriah	Positif
14	bagus bajunya semoga tidak mengecewakan	Positif
15	keren mantap sesuai ekspektasi	Positif
16	jahitan bawahnya kurang rapih	Negatif
17	alhamdulillah paketnya sudah sampe bajunya bagus banget	Positif
18	puas banget pas dan suka sekali sama bajunya	Positif
19	baju nya keren banget tidak bikin gerah	Positif
20	saran untuk ambil ukuran lebih besar satu kali karena beneran pas ramping	Positif
21	bahannya adem cuma warnanya beda sama yang di gambar	Positif
22	produk sangat bagus tidak mengecewakan	Positif
23	sesuai gambar kualitas bagus jahitan juga rapi	Positif
24	bagus sekali wajib beli di toko ini	Positif
25	bagus tidak mengecewakan dari awal pesan	Positif
26	kata suami saya corak batik nya bagus di pake nya adem juga buat undangan entar beli lagi warna coklat tolong kirim foto ke chat saya yah warna coklat	Positif
27	bagus cuman sayang ada jahitan yang tidak rapih sedikit kedepannya tolong di tingkatkan kualitasnya	Negatif
28	bagus aku pesen ukuran l buat suami aku agak kebesaran	Negatif
29	bagus berikutnya beli batik yang lain	Positif
30	alhamdulillah baju sampe dalam kondisi baik bagus	Positif

Figure 4. Data Labeling Results

The next stage, preprocessing, was conducted to transform raw textual data into a structured form suitable for machine learning analysis. As shown in Figure 5, the preprocessing workflow included several essential steps: case folding, stopword removal, tokenization, and stemming.

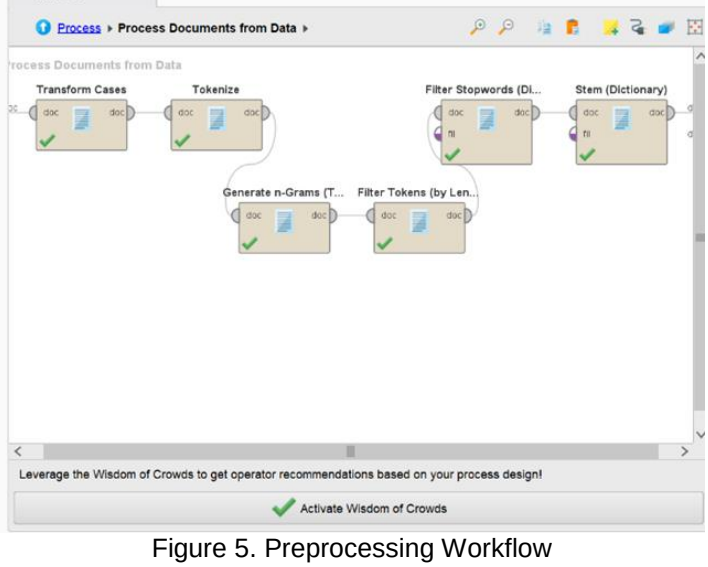

Figure 5. Preprocessing Workflow

During the case folding stage, all uppercase letters were converted into lowercase to ensure uniformity across the dataset. Table 2 demonstrates one example of this process.

Table 2. Case Folding Results

Before	After
Bagus aku pesen ukuran L buat suami aku agak kebesaran	bagus aku pesen ukuran l buat suami aku agak kebesaran

Next, stopword removal was applied to eliminate frequently used but semantically insignificant words, such as “yang,” “dan,” and “atau.” This process enhanced model efficiency by focusing on meaningful tokens only. An example is presented in Table 3.

Table 3. Stopword Removal Results

Before	After
Bagus berikutnya beli batik yang lain	bagus berikutnya beli batik lain

The tokenization process followed, breaking sentences into discrete words or tokens, which were then analyzed individually. To further refine these tokens, the stemming phase reduced words to their root forms, ensuring that inflected variations were treated uniformly by the model. Table 4 illustrates this transformation.

Table 4. Stemming Results

Before	After
disarankan untuk membeli baju batik di toko Alisa Batik Solo	sarankan untuk beli baju batik di toko Alisa Batik Solo

After preprocessing, the dataset underwent feature extraction using the Term Frequency–Inverse Document Frequency (TF-IDF) method. This technique assigned numerical weights to each term, emphasizing words that were frequent within a given comment but infrequent across all comments, as shown in Figure 6. TF-IDF is widely recognized for improving text classification accuracy in sentiment analysis.

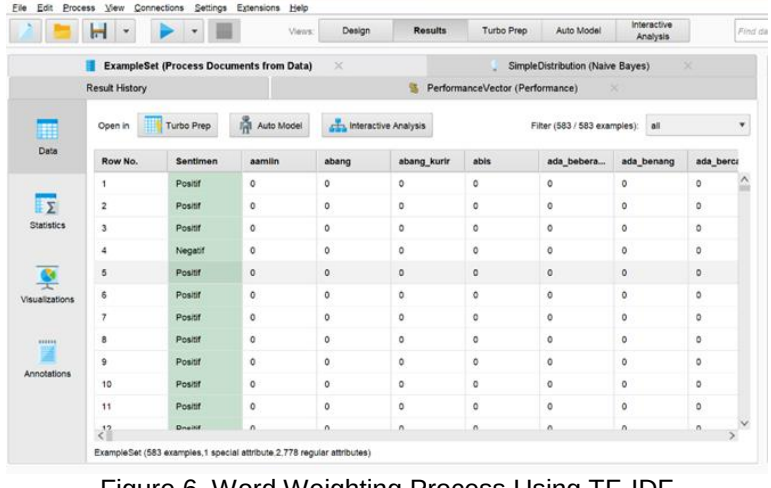

Figure 6. Word Weighting Process Using TF-IDF

The processed dataset was then analyzed using the Naïve Bayes algorithm, as illustrated in Figure 7. The data were divided into training and testing subsets, where the trained model was used to predict sentiment polarity. The *Apply Model* operator transferred the trained model to the testing phase, while the *Performance (Binomial Classification)* operator calculated the accuracy, precision, recall, and F1-score metrics to assess classification performance.

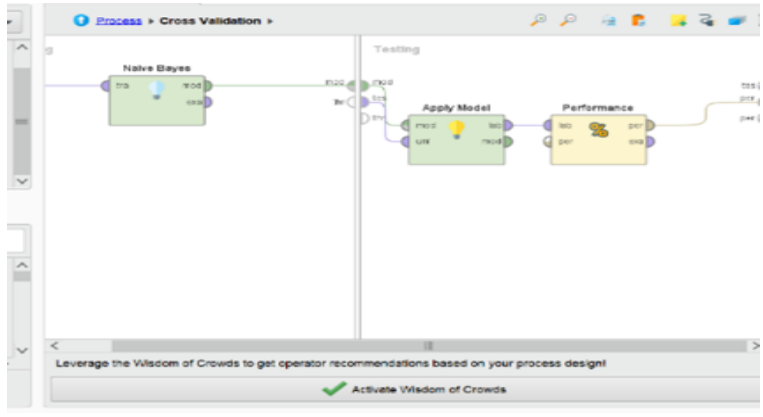

Figure 7. Naïve Bayes Testing Process

In the evaluation phase, the model workflow involved several key operators such as *Read Excel*, *Set Role*, *Remove Duplicates*, *Nominal to Text*, *Process Documents*, and *Cross Validation*. This sequence ensured systematic preprocessing, training, and testing consistency, as depicted in Figure 8.

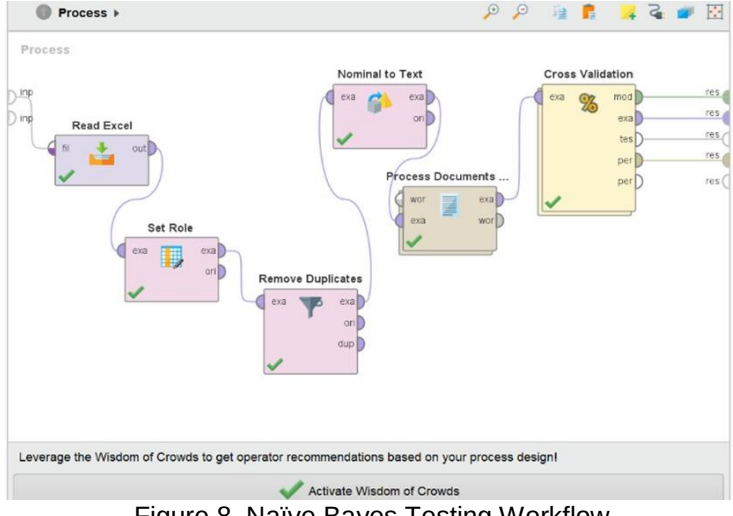

Figure 8. Naïve Bayes Testing Workflow

The performance of the model was assessed using the confusion matrix, shown in Figure 9, which summarized classification outcomes as True Positive (TP), True Negative (TN), False Positive (FP), and False Negative (FN).

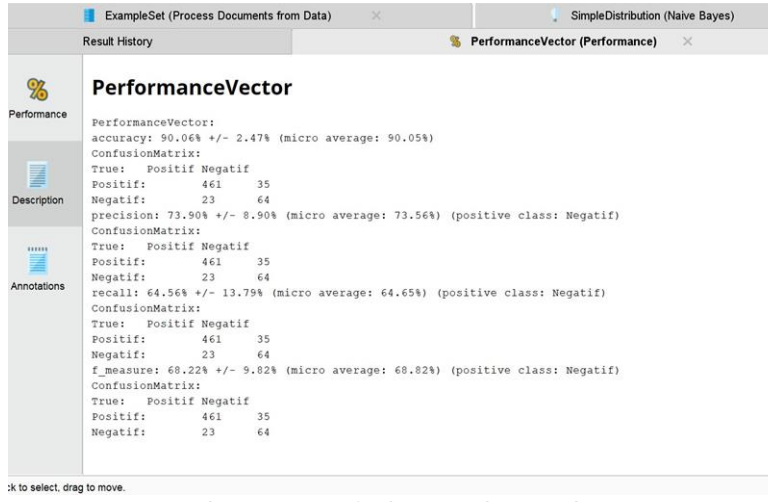

Figure 9. Confusion Matrix Results

The model correctly identified 386 positive comments (TP) and 101 negative comments (TN). However, 57 negative comments were misclassified as positive (FP), and 38 positive comments were incorrectly classified as negative (FN). These values were used to compute various evaluation metrics.

The accuracy, representing the proportion of correct predictions to total predictions, was calculated as:

$$\frac{(\mathrm{TP} + \mathrm{TN})}{(\mathrm{TP} + \mathrm{TN} + \mathrm{FP} + \mathrm{FN})} = \frac{(461 + 64)}{(461 + 64 + 35 + 23)} = 0{,}9005 = 90{,}05\%$$

The precision value for the positive class, indicating how many predicted positives were truly positive, was:

$$\frac{\mathrm{TP}}{(\mathrm{TP} + \mathrm{FP})} = \frac{(461)}{(461 + 35)} = \frac{461}{469} = 0{,}9829 = 98{,}29\%$$

For the negative class:

$$\frac{\mathrm{TN}}{(\mathrm{TN} + \mathrm{FN})} = \frac{64}{(64 + 23)} = \frac{64}{87} = 0{,}7356 = 73{,}56\%$$

The recall value, which measures the model's ability to correctly identify actual positive cases, was:

$$\frac{\mathrm{TP}}{(\mathrm{TP} + \mathrm{FN})} = \frac{461}{(461 + 23)} = \frac{461}{484} = 0{,}9524 = 95{,}24\%$$

For the negative class:

$$\frac{\mathrm{TN}}{(\mathrm{TN} + \mathrm{FP})} = \frac{64}{(64 + 35)} = \frac{64}{99} = 0{,}6464 = 64{,}64\%$$

Finally, the F1-score, representing the harmonic mean of precision and recall, was computed as:

$$2 \text{ x } \frac{\text{Precsion x Recall}}{\text{Precision + Recall}} = 2 \text{ x } \frac{0{,}9829 \text{ x } 0{,}9524}{0{,}9829 + 0{,}9524} = 0{,}9672 = 96{,}72\%$$

Table 5. Summary of Model Evaluation Metrics

Metric	Formula	Result (%)
Accuracy	(TP + TN) / (TP + TN + FP + FN)	90.05
Precision (Positive)	TP / (TP + FP)	98.29
Precision (Negative)	TN / (TN + FN)	73.56
Recall (Positive)	TP / (TP + FN)	95.24
Recall (Negative)	TN / (TN + FP)	64.64
F1-Score	2 × (Precision × Recall) / (Precision + Recall)	96.72

Based on the evaluation results, the Naïve Bayes algorithm achieved a high level of performance with an overall accuracy of 90.05%, precision of 98.29% for positive sentiment, and 73.56% for negative sentiment. The recall values of 95.24% (positive) and 64.64% (negative) indicate that while the model performs exceptionally well in identifying positive sentiments, it shows moderate sensitivity toward negative comments. The F1-score of 96.72% reinforces that the model maintains a strong balance between precision and recall, making it reliable for real-world sentiment analysis applications. The overall results demonstrate that the Naïve Bayes algorithm, supported by proper preprocessing and feature extraction using TF-IDF, performs effectively for classifying short Indonesian-language comments on TikTok. These findings are consistent with prior studies (Purwasih *et al*., 2024; Muzaki, 2024; Arif, 2024) that highlight the suitability of probabilistic models for sentiment classification in e-commerce contexts. The predominance of positive sentiment toward Alisa Batik Solo suggests favorable public perception of its product quality, customer service, and branding strategy. Meanwhile, the remaining proportion of negative comments provides valuable feedback for improving customer experience and marketing communication strategies on social media platforms.

4. Discussion

The sentiment analysis conducted using the Naïve Bayes algorithm on 626 customer reviews of Alisa Batik Solo on TikTok revealed a strong predominance of positive sentiment. As illustrated in Figure 10, approximately 75.6% (461 comments) of the reviews expressed positive opinions, while 24.4% (165 comments) reflected negative sentiment. This distribution indicates that the majority of customers hold a favorable perception of Alisa Batik Solo's products, particularly regarding product quality, fabric comfort, and motif design. Such findings align with previous studies emphasizing that customer satisfaction in online fashion commerce is strongly influenced by perceived product quality and digital engagement effectiveness (M. Ade Fahtu Rahman *et al*., 2024; Priyono & Sari, 2023).

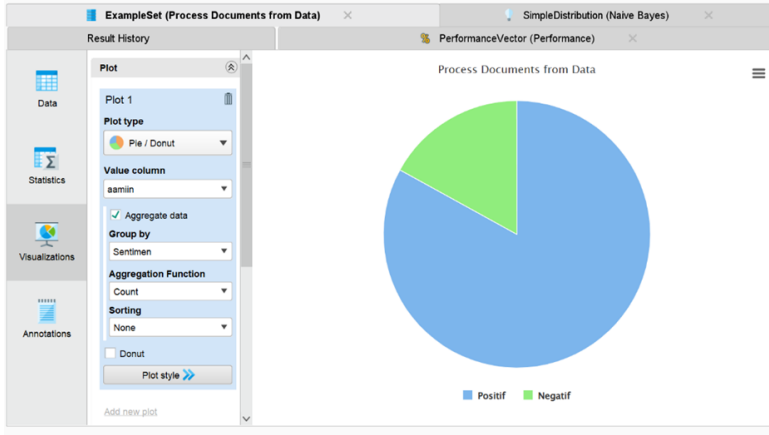

Figure 10. Sentiment Distribution Pie Chart of Customer Reviews on TikTok

From a computational standpoint, the evaluation using the confusion matrix demonstrated that the Naïve Bayes model achieved a high level of reliability. The results showed True Positive (TP) = 461, True Negative (TN) = 64, False Positive (FP) = 35, and False Negative (FN) = 23. The calculated accuracy reached 90.85%, indicating that most predictions corresponded with the actual sentiment labels. The precision score of 98.29% for positive comments suggests that nearly all positive classifications made by the model were correct, while the precision for negative comments (73.56%) reflects moderate accuracy in identifying dissatisfaction-related content. Meanwhile, the recall for positive sentiment (95.24%) confirms the model's strong sensitivity to favorable expressions, whereas the recall for negative sentiment (64.64%) shows some limitations in detecting subtle or implicit negative tones within the text. The F1-score, as a harmonic balance between precision and recall, achieved 96.72% for positive sentiment and 68.78% for negative sentiment, affirming the model's overall robustness and stability in sentiment classification.

These results are consistent with prior research demonstrating the effectiveness of Naïve Bayes for text-based sentiment analysis in Indonesian-language datasets. According to Assami Muzaki *et al*. (2024) and Fuad Amirullah *et al*. (2023), the Naïve Bayes classifier performs efficiently for datasets involving product reviews due to its probabilistic foundation and low computational complexity. Similarly, Angga Aditya Permana *et al*. (2023) found that Naïve Bayes offers strong classification accuracy when analyzing user-generated content on social media platforms, particularly Twitter and e-commerce sites. The results of this study reaffirm that probabilistic models remain effective even in short-text environments such as TikTok comments, which often contain colloquial expressions, abbreviations, and emojis.

Comparative insights from other classification techniques also support these findings. Ikhsan Habib Kusuma and Cahyono (2023) and Intan Purwasih *et al*. (2024) reported that while K-Nearest Neighbor (KNN) and Support Vector Machine (SVM) can achieve comparable accuracy, the Naïve Bayes algorithm offers higher computational efficiency and better generalization in small to medium-sized datasets. In parallel, Tania Puspa Rahayu Sanjaya and Firmansyah (2023) emphasized that integrating TF-IDF for feature extraction enhances Naïve Bayes performance by refining word-weight representation, which aligns with the methodology adopted in this research. From a business and marketing perspective, the dominance of positive sentiment suggests that Alisa Batik Solo has successfully built a strong brand image within TikTok's social commerce ecosystem. According to Muhammad Bintang Priyono and Sari (2023), the TikTok Shop platform significantly contributes to improving the visibility and sales performance of micro, small, and medium

enterprises (MSMEs) in Indonesia. The findings of this study strengthen that view, as positive sentiment toward Alisa Batik Solo reflects effective customer engagement and marketing communication strategies. Moreover, as highlighted by Mhd. Fakhrozi Arif *et al*. (2024), sentiment analysis outcomes can serve as an indicator of customer satisfaction and as a data-driven basis for improving service quality and business strategy in the batik industry.

In addition, Muhamad Rizaludin *et al*. (2024) and Raihan Putra Mohammad Rosidi and Setiawan (2024) demonstrated that Naïve Bayes can effectively identify consumer purchasing patterns and behavioral tendencies, particularly in predicting buying decisions in online marketplaces. This study extends those findings by applying the same computational framework to social media-based transactions, where consumer sentiment is not only a reaction to product attributes but also shaped by digital interaction dynamics, influencer engagement, and social proof mechanisms. Overall, the results underscore that the Naïve Bayes algorithm, supported by TF-IDF vectorization and proper data preprocessing, provides an effective and interpretable model for classifying Indonesian-language e-commerce reviews. The model's high accuracy demonstrates its capability to capture the linguistic nuances of customer opinions on social media. However, the relatively lower precision and recall in detecting negative sentiment suggest the potential for integrating hybrid models—such as combining Naïve Bayes with SVM or deep learning architectures (CNN, LSTM)—to improve semantic understanding and handle complex contextual sentiment. Future research should therefore consider expanding datasets across longer time frames and multiple e-commerce platforms to enhance the generalizability and robustness of sentiment prediction in Indonesia's rapidly evolving digital commerce ecosystem.

5. Conclusion

This study concludes that the majority of customer sentiments toward Alisa Batik Solo on TikTok are positive, accounting for 75.6% of the analyzed comments, while 24.4% reflect negative perceptions from a total of 626 customer reviews. These findings indicate that Alisa Batik Solo has successfully achieved favorable public reception, particularly regarding service quality, product design, and user experience. The dominance of positive sentiment also highlights consumer trust and satisfaction with the brand's online presence and engagement strategy on social media platforms. From a methodological perspective, the research demonstrates that the Naïve Bayes algorithm is effective for analyzing short Indonesian-language texts, achieving an accuracy of 90.85%, positive precision of 98.29%, positive recall of 95.24%, and an F1-score of 96.72%. These metrics confirm that the combination of text preprocessing, TF-IDF-based feature weighting, and probabilistic classification produces reliable outcomes in sentiment analysis of user-generated content. The results also reinforce the position of Naïve Bayes as a lightweight yet robust model for linguistic pattern recognition in e-commerce contexts.

Practically, this research provides valuable insights for businesses—particularly in the fashion and creative industries—by offering data-driven guidance for developing sentiment-based marketing strategies, reputation management systems, and customer experience optimization. The identification of negative sentiments can further serve as constructive feedback to improve service delivery, content strategy, and product quality within Alisa Batik Solo's online marketplace operations. For future research, it is recommended to expand the dataset in both volume and diversity, covering longer observation periods and multiple social media or e-commerce platforms to enhance model generalizability. Subsequent studies may also compare Naïve Bayes performance with other machine learning and deep learning algorithms

such as Support Vector Machine (SVM), Random Forest, Long Short-Term Memory (LSTM), and Convolutional Neural Networks (CNN). Such comparative analysis could provide deeper insights into optimizing sentiment classification accuracy and adapting models to more complex linguistic and contextual variations in Indonesian digital commerce.

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