

TikTok Live Chat Analysis Using NLP for Sales and Spam Detection: A Systematic Literature Review

Wahyu Candra Setyaji^{1✉}, Novia Ratnasari², Anisa Hudi Widaningrum³,
Amalia Agung Septarina⁴

^{1, 2, 3} Department of Information System, Faculty of Science and Technology, Universitas Islam Raden Rahmat, Indonesia

⁴ Department of Informatic Engineering, Faculty of Science and Technology, Universitas Islam Raden Rahmat, Indonesia

✉ **Corresponding Author:** Wahyu Candra Setyaji (e-mail: wahyuucs0530@gmail.com)

Article Information	ABSTRACT
Article History Received : August 21, 2025 Revised : September 04, 2025 Published : October 04, 2025	The growing popularity of social commerce platforms such as TikTok Shop Live offers an interactive shopping experience through live streaming and chat features. However, many messages in the chat are irrelevant to sales, often containing spam or meaningless comments. This study examines the effectiveness of Natural Language Processing (NLP) methods in distinguishing between sales-related and spam chats to improve seller–consumer interactions. A systematic literature review was conducted on 13 articles focusing on spam detection and chat classification. The findings reveal that classical methods such as Naïve Bayes with TF-IDF achieve an accuracy of 85–90%, while K-Nearest Neighbor (KNN) and Logistic Regression are effective for simple cases with an accuracy of 80–87%. Deep learning methods deliver higher performance, with Long Short-Term Memory (LSTM) achieving 90–93% due to its strength in recognizing sequential patterns and informal language, while Convolutional Neural Networks (CNN) reach competitive accuracy rates of 88–91%. Transformer-based models, particularly Multilingual BERT, yield the highest accuracy (93–95%) because of their ability to capture contextual meanings in informal Indonesian texts. These findings confirm that a combination of classical and modern NLP methods is effective in supporting automated TikTok Live chat detection systems and can be further developed into real-time applications to enhance interaction quality, data-driven decision-making, and consumer satisfaction.
Keywords: <i>Tiktok Shop; Chat Live; Spam Detection; NLP; Systematic Literature Review.</i>	

INTRODUCTION

The advancement of digital technology has transformed various aspects of human life, including how people interact and shop online. One of the most prominent phenomena in recent years is the widespread use of live streaming features on e-commerce platforms. In Indonesia, TikTok Shop Live has emerged as a popular form of social commerce, especially among the younger Generation Z demographic. TikTok Shop not only provides entertainment through short videos but also offers an interactive and real-time shopping experience through live chat features. Generation Z shows a high tendency to engage with TikTok Shop due to its convenience, perceived benefits, and low perceived risk. These features hold a unique appeal for a generation raised in an era of instant digital gratification (Sa'adah et al., 2022). They prefer shopping experiences that are fast, efficient, and hassle-free—all of which are well-facilitated by TikTok Shop.

However, during TikTok Shop Live sessions, not all messages in the chat column are relevant to purchasing activities. Many of them are spam or merely meaningless comments, which poses a particular challenge for sellers to filter and respond only to messages that truly contribute to sales. Studies on the impact of digital marketing on TikTok Shop indicate that while the live streaming feature does not always directly influence purchase decisions, creative and interactive content remains a key supporting factor in attracting consumer interest. Real-time chat interactions allow potential buyers to directly inquire about products, observe the seller's responses, and build greater trust in making a transaction (Rhadiana TBP et al., 2025).

Studies on public opinion toward TikTok Shop are highly diverse and can be automatically classified using sentiment analysis approaches. By utilizing algorithms such as Naïve Bayes and K-Nearest Neighbor, these studies are capable of identifying positive, negative, and neutral opinions regarding TikTok Shop features, demonstrating the significant potential of NLP techniques in interpreting user-generated textual data (Fieryando & Kristianto, 2024). Additionally, other research highlights the crucial role of live streaming, online customer reviews, and influencer marketing in shaping consumer purchase intentions (Ali Khoirun Nasikhin et al., 2024; Prasetyo, 2024). Live streaming serves not only as a promotional tool but also as a means to strengthen communication between brands and consumers. Moreover, consumer trust in the seller can significantly encourage purchase decisions for the products being promoted (Suarna, 2022).

Natural Language Processing (NLP) emerges as a technological solution for automatically processing and understanding natural language. NLP is particularly well-suited for analyzing information from textual data and for facilitating the generation of insights that can be used in further analysis (Majid et al., 2023). With the aid of NLP, systems can automatically distinguish between sales-relevant messages and spam messages. Based on the above explanation, it is essential to examine the potential application of NLP in classifying TikTok Shop Live chats. This study aims to review previous research to evaluate which approaches are most effective in distinguishing between sales-related and spam chats, thereby providing both theoretical and practical contributions to the development of text-based social commerce systems.

RESEARCH METHODS

There are four stages in conducting a Systematic Literature Review: a) Research Questions; b) Inclusion Criteria; c) Identification of Papers; and d) Conclusion (Ratnasari et al., 2020).

1. Research Questions

At the research questions stage, a total of 13 journals were systematically grouped and identified according to their year of publication, title, authors, and main discussion topics, after which a comprehensive summary was compiled.

2. Inclusion Criteria

In this stage, the selection of articles as research samples was carried out using inclusion criteria. The selected journals were required to focus on TikTok Shop analysis and specifically address topics related to spam detection and sales chat classification, ensuring consistency and relevance to the research scope.

3. Identification of Papers

During this process, the identified journals were categorized and documented in a structured table that outlines the topic, number of studies, and research focus. In total, 13 journals were included, each providing insights into methods for classifying comments to detect potential product-related interactions.

Tabel 1. Identification of Papers

No	Topic	A Number of Journals	Focus Journal
1	Spam and sales chat detection	13	Classifying comments that are utilized for product potential detection

4. Conclusion

After completing all phases, conclusions were drawn based on a synthesis of the reviewed studies. The findings were supported by existing literature, evidence, and comparative analysis with previous research, thereby generating recommendations on the role of NLP in classifying text within TikTok Shop Live chats.

RESULTS AND DISCUSSION

As part of the literature review, a total of 13 articles were examined. The review specifically focused on identifying which NLP methods are most effective in classifying spam and sales-related chats.

Spam Detection and Sales Chat

In the context of TikTok Shop Live, the presence of spam or irrelevant comments in the chat section poses a significant challenge. Many of these messages do not contribute to purchasing decisions, such as random remarks, personal advertisements, or even bot-generated content. To address this issue, several studies have developed spam detection methods capable of distinguishing between sales-relevant messages and disruptive ones.

The Naïve Bayes algorithm is known for its stable and efficient performance in text classification tasks, including spam detection on social media platforms (Prayoga et al., 2018). This approach has been proven to yield high accuracy in various studies, especially when applied to platforms with high message traffic such as Twitter (X) (Wahyuningtyas et al., 2020). Additionally, the K-Nearest Neighbor algorithm has also demonstrated effectiveness in identifying irrelevant comments on social media platforms such as Instagram (Chrismanto et al., 2022). In terms of text representation, the Term Frequency–Inverse Document Frequency (TF-IDF) method is widely used to extract significant keywords from social commerce comments to identify potential product-related interactions (Pratama & Dahlan, 2025). This method has also proven accurate in separating spam messages from meaningful ones in various contexts, including email classification (Fitria et al., 2024). Another commonly used approach is logistic regression, which is considered effective for binary classification tasks, particularly when text data features are sufficiently relevant and well-structured (Nur et al., 2023).

In addition to classical algorithms, deep learning models have also demonstrated high performance in spam detection. Models such as Long Short-Term Memory (LSTM) outperform others in recognizing sequential patterns in text data, while Convolutional Neural Networks (CNN) yield competitive results in message classification tasks (Siringoringo et al., 2023). Compared to CNN, LSTM is considered more effective in handling complex word sequences (Al Kautsar et al., 2025). On the other hand, transformer-based approaches such as multilingual BERT have emerged as modern alternatives capable of enhancing spam detection accuracy, particularly in Indonesian-language texts, due to their superior contextual word understanding (Amin et al., 2024). This approach is particularly useful in managing the unstructured and informal language often found in TikTok comments. Moreover, NLP-based spam detection techniques have also been successfully applied to other platforms such as YouTube, by combining comment content analysis with user behavior tracking (Jalali Wal Ikram & Fachri Pane, 2023). This indicates that NLP approaches for spam detection are flexible and relevant for cross-platform digital applications.

Tabel.4 Results of the Review of Research Article on Spam Detection and Sales Chat

No	Year	Title	Writer	Topics
1	2018	Design and Construction of a Twitter Spam Detection Application Using Naive Bayes and KNN Methods on Android Mobile Devices	Faisal Aji Prayoga, Aryo Pinandito, Rizal Setya Perdana	Designing an application to classify spam on Twitter
2	2020	Potential Comment Analysis on Instagram Social Commerce Using TF-IDF	Rizqa Luviana Musyarofah, Ema Utami, Suwanto Raharjo	Analyzing comments on Instagram stores
3	2020	Spam Detection On Twitter Using Naïve Bayes Algorithm	Andita Wahyuningtyas, Imas Sukaesih Sitanggang, Husnul Khotimah	Detecting spam on Twitter using the Naïve Bayes method
4	2020	Implementation of Distance Weighted K-Nearest Neighbor for Spam & Non-Spam Classification on Instagram Comments	Antonius Rachmat Chrismanto, Yuan Lukito, Anton Susilo	Implementing and knowing the accuracy of the DWKNN algorithm for detecting spam comments on IG
5	2022	Critical Evaluation On Spam Content Detection In Social Media	Antonius Rachmat Chrismanto, Anny Kartika Sari, Yohanes Suyanto	Detecting text-based spam on social media
6	2022	Selection of the Best Algorithm for Email Type Classification Using the TF-IDF Method	Denisa Fitria, Yana Cahyana, Dwi Sulistya, Kiki Ahmad Baihaqi	Detecting spam in email with TF-IDF Method
7	2023	Bidirectional LSTM Model for Sequential Processing of Spam Text Data	Rimbun Siringoringo, Jamaluddin, Resianta Perangin-Angin, Eva Julia G. Harianja, Gortap Lumbantoruan, Eviyanti Novita Purba	Testing LSTM-based models in processing spam data text
8	2023	Implementation of Logistic Regression Algorithm for Binary Classification in SMS and WhatsApp Spam	Ana Nur Rani Hasanah, Rr. Artiana Krestianti, Sutresna Wati	Performing binary classification on data and spam using the logistic regression algorithm method
9	2023	Detecting Spam Bots in YouTube Comments: A Systematic Literature Review	Dzul Jalali Wal Ikrama, Syafril Fachri Pane	Identifying spam in comments on YouTube
10	2024	Text-Based Indonesian Spam Detection Using the BERT Model	Muhammad Basil Musyaffa Amin, Gibran Hakim, Muhammad Taufik Maulana, Muhammad Fajrul Alwan, Hanna Shafira Anggraheni, Muhammad Jilan Naufal, Novanto Yudistira	Detecting and classifying text with MultilingualBERT
11	2024	Classification of Sarcasm Tweets on Platform X Using Bidirectional Encoder	Rizal Akbar Fitrianto, Arda Surya Editya	Applying NLP to detect sarcasm

No	Year	Title	Writer	Topics
12	2025	Representations From Transformers Comparative Analysis of LSTM and CNN Performance in Deep Learning-Based Email Spam Detection	Maugy Al Kautsar, Galet Guntoro Setiaji, Ahmad Rifa'i	Comparing LTSM and CNN for detecting spam in email
13	2025	Comparison of the Performance of Naive Bayes, SVM, and BERT Models in Review Sentiment Classification on the YUMMY Application	Sabrina Amanda Salsabila, Bayu Priyatna, Agustia Hananto, Tukino	Comparing Naïve Bayes, SVM, and BERT Models in Review Sentiment Classification

Based on the above discussion, a table summarizing the effectiveness of various NLP methods in detecting sales-related and spam chats can be constructed as follows:

Tabel 3. Table. Accuracy of NLP Methods in Detecting Sales and Spam Chats

Method	Characteristics	Accuracy (%)
Naïve Bayes + TF-IDF	Stable, fast, efficient for large-scale data	85 – 90
K-Nearest Neighbor (KNN)	Effective for simple data, sensitive to dataset size	82 – 87
Logistic Regression	Suitable for simple binary classification	80 – 85
Convolutional Neural Network (CNN)	Competitive, effective for simple text patterns	88 – 91
Long Short-Term Memory (LSTM)	Superior in handling sequential patterns & informal text	90 – 93
Transformer (Multilingual BERT)	Most effective, captures context & informal language use	93 – 95

Thus, based on the reviewed literature, spam detection and the identification of sales-related messages can be effectively carried out through a combination of classical and modern NLP methods. However, the use of BERT provides the most optimal results for detecting sales and spam chats on TikTok Live, as it is capable of understanding the contextual meaning of informal Indonesian language. LSTM is also highly effective, while classical methods such as Naïve Bayes with TF-IDF remain relevant for lightweight systems with reasonably high performance.

CONCLUSION

This study confirms that the application of Natural Language Processing (NLP) is highly effective in distinguishing between sales-related and spam chats on TikTok Shop Live. Classical methods such as Naïve Bayes with TF-IDF remain relevant because they are efficient and deliver relatively high accuracy when applied to large-scale text data, although their performance is lower compared to modern approaches. Deep learning models, particularly Long Short-Term Memory (LSTM), demonstrate superior capabilities in capturing sequential patterns and processing informal language, while Convolutional Neural Networks (CNN) also provide competitive results. Meanwhile, Transformer-based approaches, especially Multilingual BERT, achieve the highest performance with accuracy rates of up to 95%, owing to their ability to capture contextual meanings in informal Indonesian texts that characterize TikTok Live chats.

The contributions of this study are both theoretical and practical. Theoretically, the findings enrich the body of knowledge regarding the application of NLP in text-based social commerce, particularly within the Indonesian language context. Practically, the results provide a foundation for developing automated detection systems that can assist sellers in filtering and responding to sales-relevant chats, thereby improving interaction quality, communication effectiveness, and consumer satisfaction.

Nevertheless, this study has certain limitations, as it is based solely on a systematic literature review of 13 articles without direct implementation on real TikTok Shop Live data. These limitations open opportunities for future research to evaluate NLP models using real-world datasets, develop hybrid models that combine classical and modern methods, and integrate them into real-time systems. Such advancements are expected to provide more comprehensive and applicable solutions in supporting seller–consumer interactions on social commerce platforms.

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