THE ANALYSIS OF EFFECTIVENESS OF USING DRONE EMPRIT AS A CYBER PATROL ASSISTANCE TOOL: LAMPUNG AND NORTH SUMATRA REGIONAL ELECTION STUDY CASE

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Abstract
This study evaluates the effectiveness of Drone Emprit as a cyber patrol tool during the 2024 regional elections (Pilkada) in Lampung and North Sumatra. By leveraging big data analytics and natural language processing, Drone Emprit monitors public sentiment and key issues on social media, such as neutrality of civil servants (ASN), misinformation, and potential conflicts. Using a mixed-method approach, data were collected from Twitter over four observation periods. The findings show significant changes in public sentiment, with positivity dominating early periods and negativity increasing in later periods due to controversies. The analysis highlights Drone Emprit real-time capabilities in detecting public sentiment, identifying key issues, and supporting strategic decision-making. This study underscores the potential of big data tools to enhance cyber patrols and maintain social stability during politically sensitive periods.

Keywords: *Drone Emprit, Cyber Patrol, Public Sentiment, Misinformation, Pilkada*

1. INTRODUCTION

In today's digital age, cyber patrol has become an essential part of how law enforcement works to ensure information security and social stability. The rapid evolution of technology has completely changed the way people share and consume information, which has also reshaped public discussions. Social media platforms are now the main stage for conversations, but they come with serious challenges. One of the biggest problems is the spread of misinformation and disinformation, which can easily distort how people perceive events (Walsh & O'Connor, 2019).

Twitter, Facebook, and similar platforms often become hotspots for narratives that escalate tensions, especially during politically sensitive times like elections or crises (Borradaile et al., 2020). While these platforms do allow for the quick dissemination of information, it's not always for the better. Studies have shown that negative content tends to spread faster than positive or neutral messages, which can increase the risk of social conflicts (Tsugawa & Ohsaki, 2017). This highlights how critical it is to have effective systems for monitoring and managing these risks.

To deal with these challenges, law enforcement agencies are relying more and more on data-driven strategies (Jurek et al., 2014). They play an important role in identifying threats like fake news, hate speech, or polarizing narratives that could threaten social harmony. The ability to analyze vast amounts of data in real time is absolutely essential. For example, during local elections (Pilkada), social media often becomes a tool for propaganda, and if left unchecked, it can deepen divides within society (Bahtiar et al., 2023).

Cyber patrol is also a key factor in maintaining public trust in both law enforcement and democratic processes (Putra & Sutanto, 2022). Technologies like big data and sentiment analysis have greatly improved how agencies can track trends in public opinion and preempt potential security issues. By utilizing these tools, law enforcement can gather valuable insights into what people are concerned about, allowing them to act early to prevent problems (Izza et al., 2023; Jurek et al., 2014).

However, the rapid spread of misinformation is still a huge challenge. Social media algorithms, which are designed to promote sensational content, make the problem even worse (Kovács et al., 2021). These algorithms often favor posts that generate a lot of engagement, which unfortunately can mean amplifying false or misleading information. Research shows that fake news spreads more virally than accurate information, especially when it's emotionally charged. Negative messages, in particular, tend to spread much faster than others, creating even bigger ripple effects (Kovács et al., 2021; Tsugawa & Ohsaki, 2017).

The limitations of current monitoring tools highlight the need for more innovative, data-driven solutions. Building strong collaborations between law enforcement and tech platforms is crucial for improving early detection and transparency in tackling misinformation. By working together, these entities can create better systems for identifying and responding to harmful content. This partnership can also help in educating the public, ensuring that accurate and reliable information reaches more people effectively.

Drone Emprit is a big data analytics tool specifically designed to monitor strategic issues on social media, especially during sensitive periods like local elections. It helps identify key narratives, public sentiment, and emerging trends, providing policymakers with actionable insights. For example, during elections, Drone Emprit maps public discussions on critical topics, such as the neutrality of civil servants or political party dynamics, giving leaders a clear basis for making decisions (Bahtiar et al., 2023; Izza et al., 2023). Its proven effectiveness in detecting harmful narratives highlights its potential in shaping more precise and informed policy-making (Jurek et al., 2014).

The public has high expectations of law enforcement, particularly in maintaining digital security during key moments like elections. How effectively tools like Drone Emprit are used in managing digital narratives often becomes a benchmark for public trust. Transparency in handling public data and swift responses to emerging issues are essential for strengthening the image of law enforcement as professional and dependable (Al-Khateeb et al., 2019; Walsh & O'Connor, 2019). Regularly monitoring public discussions not only builds trust but also minimizes the spread of misinformation, ensuring greater professionalism.

In times of crisis, such as during elections, the need for real-time analysis becomes even more critical. Tools like Drone Emprit can track dominant sentiment trends and provide rapid responses to shifts in public opinion, helping to prevent social conflicts before they escalate (Izza et al., 2023; Tsugawa & Ohsaki, 2017). Speed and accuracy in processing data have become essential for ensuring that cyber patrols remain effective. Drone Emprit offers a fast and reliable way to monitor social media dynamics, particularly in handling issues like misinformation, polarization, and potential conflicts.

The tool's ability to analyze large amounts of data in real-time gives law enforcement a significant edge. They can take preventative measures before small issues spiral into larger threats. Research also indicates that sentiment analysis, as implemented

by tools like Drone Emprit, is highly effective in detecting early signs of public unrest or tensions (Bahtiar et al., 2023; Izza et al., 2023; Tsugawa & Ohsaki, 2017). With such capabilities, law enforcement can act strategically to defuse conflict and maintain stability in society.

However, while Drone Emprit excels at fast analysis, it does have its limitations. This technology is great at capturing broad trends and macro-level patterns but struggles with the nuance and context of more complex narratives. For example, in situations involving accusations of civil servant bias or the spread of hoaxes, the underlying narratives are often too intricate for data alone to unpack. These cases require human interpretation and deeper manual analysis to fully understand what's driving the sentiment shifts (Jurek et al., 2014; Kovács et al., 2021).

Previous research has highlighted that manual validation plays a key role in improving the accuracy of sentiment analysis, especially in managing strategic issues on social media (Bahtiar et al., 2023; Jurek et al., 2014). While big data technologies like Drone Emprit offer significant efficiency, manual analysis remains essential for providing a more nuanced and comprehensive understanding of the narratives developing online. However, manual methods often face challenges in scale and speed, which are inadequate to handle the ever-growing volume of social media data effectively (Herath et al., 2022). This limitation underscores the need for combining automated tools with manual validation to enhance the overall capability of cyber patrols.

In this context, big data technology provides an efficient and targeted solution for mapping trends and identifying emerging narrative patterns without unnecessary delays. Tools like Drone Emprit allow law enforcement to track significant changes in public opinion in real-time, offering early warnings about potential conflicts that require rapid response (Izza et al., 2023; Kovács et al., 2021). For example, during sensitive periods such as local elections, Drone Emprit has been used to monitor public sentiment and detect shifts in discussions on sensitive issues like civil servant neutrality and political polarization (Silalahi & Toni, 2021; Walsh & O'Connor, 2019). This ability to detect early warnings significantly enhances law enforcement's capacity to maintain social stability.

By mapping sentiment trends and narrative patterns on social media, tools like Drone Emprit can identify potential conflicts before they escalate into larger issues. For instance, a sudden increase in discussions about controversial topics, such as political conflicts, can act as an early signal for authorities to take immediate action (Kovács et al., 2021; Tsugawa & Ohsaki, 2017). This capability allows law enforcement to respond more strategically, ensuring that public order is maintained.

To maximize the effectiveness of cyber patrols, law enforcement agencies need to combine big data analytics with manual analysis. This integrated approach offers a balance between speed and depth, enabling a more contextual understanding of emerging issues. Evidence has shown that combining these methods is particularly effective in reducing social tensions during critical events like elections (Bahtiar et al., 2023; Jurek et al., 2014). By leveraging the strengths of both technologies and human expertise, law enforcement can ensure more adaptive and strategic information management to safeguard social harmony.

Big data tools, such as Drone Emprit, offer strategic solutions for more responsive and adaptive cyber patrols. These technologies enable real-time sentiment analysis, allowing law enforcement to address rapidly evolving information dynamics efficiently.

Moreover, the combination of automated analytics with human interpretation adds contextual depth, making it easier to handle complex narratives that require flexibility (Al-Khateeb et al., 2019).

During high-stakes events like local elections, this capability becomes even more crucial. Tools like Drone Emprit support law enforcement in maintaining social stability by providing valid and actionable data for timely mitigation measures. However, while the tool has been widely used, its application in regions like Lampung and North Sumatra remains limited. Addressing this gap is essential to understand the full potential of this technology in managing localized issues (Bahtiar et al., 2023; Walsh & O'Connor, 2019).

Further research is needed to explore the strengths and limitations of Drone Emprit in detecting and analyzing strategic issues. Such studies can provide better insights into how digital monitoring techniques can be improved to support evidence-based decision-making at the local level (Ralph & Robinson, 2023). In this context, the current research aims to evaluate Drone Emprit role in enhancing cyber patrols at the regional level and contribute to broader discussions on how technology intersects with public safety.

Specifically, this study examines the effectiveness of Drone Emprit as a cyber patrol tool during local elections in Lampung and North Sumatra, regions with unique socio-political dynamics that present distinct challenges to social stability. By analyzing public sentiment dynamics during the electoral period, this research seeks to identify changes in positive, neutral, and negative sentiments that may indicate potential tensions or conflicts. Understanding these shifts will provide deeper insights into public opinion trends and their implications for social harmony.

In addition, the study investigates critical issues such as misinformation and civil servant neutrality, which often dominate online discussions during elections and contribute to polarization. By utilizing Drone Emprit ability to monitor dominant narratives and emerging topics, the study tracks the development and spread of these issues over time. Furthermore, it evaluates how Drone Emprit enhances law enforcement's ability to counter digital threats like hoaxes, hate speech, and politically motivated propaganda. This evaluation aims to provide actionable insights into how this tool supports law enforcement in maintaining social stability and improving digital monitoring strategies, particularly during politically sensitive periods (Hollingshead et al., 2019).

This research employs a mixed-methods approach, combining quantitative and qualitative analyses. Data were collected from Twitter over four observation periods, focusing on public sentiment related to key issues such as misinformation, civil servant neutrality, and party support. The analysis involved sentiment classification into positive, negative, and neutral categories, as well as the identification of emerging trends and narratives. This comprehensive methodology allows for a nuanced understanding of public opinion dynamics during the local elections.

2. LITERATURE REVIEW

The rapid expansion of digital platforms has transformed the landscape of public discourse, creating both opportunities and challenges for law enforcement. Social media, as a primary arena for communication, has facilitated the dissemination of information while simultaneously enabling the spread of disinformation, hate speech, and polarizing narratives. To navigate these complexities, law enforcement has adopted cyber patrol as

a critical tool for ensuring public safety and maintaining societal stability (Walsh & O'Connor, 2019). Advanced technologies like sentiment analysis and big data analytics have further enhanced the capabilities of cyber patrol initiatives, allowing for more comprehensive and proactive approaches in managing digital threats.

2.1. Defining Cyber Patrol

Cyber patrol refers to the focused monitoring and management of digital spaces, particularly social media platforms, to spot and handle potential risks. This involves keeping an eye on fake news, tracking harmful speech, and digging into public discussions during key moments (Walsh & O'Connor, 2019). At its core, cyber patrol is about keeping people safe, promoting social harmony, and making sure law enforcement operates transparently. Tools like Drone Emprit have become key players in this effort, offering practical insights into how the public feels about specific issues and what narratives are gaining traction.

Cyber patrol becomes especially crucial during high-stakes times, like elections, when false information and propaganda often flood online spaces. Take the 2020 regional elections in Lampung and North Sumatra as an example. During this period, Drone Emprit played a vital role by tracking conversations about sensitive topics, such as whether civil servants were staying neutral or how political biases were being perceived (Bahtiar et al., 2023). This kind of monitoring allowed law enforcement to step in early and tackle potential problems before they got out of hand. Still, while cyber patrol is essential for keeping digital spaces in check, it needs to be carried out thoughtfully. Without proper ethical guidelines, it risks crossing into territory that invades people's privacy or curbs their rights (Nawawi et al., 2023).

2.2. The Role of Sentiment Analysis in Cyber Patrol

Sentiment analysis is a crucial component of cyber patrol, enabling law enforcement to delve into the emotions and opinions shared online. Defined as the computational study of opinions, sentiments, and emotions expressed in text (Yaqub et al., 2021), this technique categorizes public sentiment into positive, neutral, or negative groups. By doing so, it provides a clear picture of collective mood dynamics, helping law enforcement identify potential triggers for unrest or dissatisfaction. These insights are especially useful during politically charged periods or critical public events, as sudden increases in negative sentiment around a specific issue can signal brewing tensions (Ruz et al., 2020).

The value of sentiment analysis has been demonstrated across diverse contexts. Tsugawa and Ohsaki (2017) observed that negative content not only spreads faster than positive or neutral information but also exerts a more significant influence on public opinion, underscoring the importance of proactive monitoring. Similarly, Ruz et al. (2020) highlighted the application of sentiment analysis during high-stakes events, such as natural disasters and political crises, where real-time analysis of public emotions helped authorities manage crises more effectively. These studies show how tools like Drone Emprit can leverage sentiment analysis to uncover risks and monitor emotional patterns in real time, enabling law enforcement to act promptly and prevent potential conflicts.

Beyond managing immediate threats, sentiment analysis plays an essential role in shaping long-term public relations and communication strategies. By understanding the

emotional undertones of public discourse, law enforcement and institutions can craft messages that resonate with public concerns, fostering trust and improving engagement (Yaqub et al., 2021). This dual capability—proactive risk mitigation and enhanced public communication—demonstrates the indispensable role of sentiment analysis in modern law enforcement practices, particularly in digital spaces (Ruz et al., 2020; Tsugawa & Ohsaki, 2017).

2.3. The Integration of Big Data Analytics

Big data analytics has drastically transformed the effectiveness of cyber patrol, offering unprecedented capabilities to process and analyze massive datasets in real time. Tools like Drone Emprit demonstrate the power of combining big data techniques with sentiment analysis, enabling the identification of dominant narratives, tracking public sentiment trends, and assessing risks during critical events. For instance, Bahtiar et al. (2023) showcased the effectiveness of Drone Emprit in monitoring Twitter discussions during elections. Their study highlighted its ability to detect artificially amplified narratives and bot-driven propaganda, providing law enforcement with actionable insights to counter potential disruptions.

The application of big data analytics is not limited to elections but has also shown potential in broader contexts. For example, tools like Drone Emprit could be adapted for monitoring societal trends, such as public health responses during pandemics or shifts in public opinion following major policy changes. This adaptability underscores the value of big data analytics in addressing diverse challenges, making it a versatile tool for law enforcement and public institutions alike.

Despite the impressive speed and scalability of big data systems, they are not without limitations. Automated tools often struggle to capture the nuanced aspects of complex narratives, particularly in regions with diverse socio-political dynamics. Yaqub et al. (2021) emphasized the importance of integrating manual validation with automated systems to ensure contextual accuracy. This hybrid approach combines human expertise with technological efficiency, enabling a more comprehensive understanding of intricate narratives. By bridging the gap between automation and human interpretation, big data analytics can remain a reliable and adaptable tool, even in highly dynamic environments.

2.4. Ethical Considerations and Community Engagement

The implementation of cyber patrol initiatives inevitably raises important ethical questions, especially concerning issues of privacy and surveillance. While these programs are designed to maintain public safety and curb online threats, they must strike a delicate balance by respecting individual rights and freedoms. Nawawi et al. (2023) emphasize the importance of incorporating participatory frameworks in the development of cyber patrol strategies. Such frameworks involve actively engaging community members to ensure that these initiatives are transparent and foster public trust. By involving the community, law enforcement can make their efforts feel more legitimate, demonstrating that they are aligned with societal values rather than imposing top-down surveillance measures.

Ralph and Robinson (2023) underline the critical need for well-defined ethical guidelines to govern the use of cyber patrol tools. Without such guidelines, there is a significant risk of misuse, especially in politically sensitive situations where surveillance could be perceived as biased or intrusive. For example, missteps in monitoring could lead

to accusations of targeting specific groups or stifling dissent, which can undermine the credibility of law enforcement. These risks highlight the importance of ensuring that cyber patrol operations adhere to democratic principles, where transparency, accountability, and fairness are prioritized.

Ethical considerations must be integrated into every stage of planning and execution for cyber patrol initiatives. This means not only ensuring that surveillance technologies are used responsibly but also implementing safeguards to protect civil liberties. For instance, clear protocols should dictate what data can be collected, how it is stored, and who has access to it. By embedding these ethical practices into the fabric of cyber patrol strategies, law enforcement can better balance the need for security with the protection of individual freedoms. Ultimately, building a framework that values ethics and inclusivity is key to ensuring that cyber patrol initiatives serve the public good without compromising democratic principles (Nawawi et al., 2023; Ralph & Robinson, 2023).

2.5. Gaps in the Literature

Despite significant advancements in cyber patrol technologies, notable gaps persist within the existing literature. One major gap lies in the limited focus on localized applications, particularly in regions such as Lampung and North Sumatra, which have unique socio-political dynamics. Most existing studies tend to concentrate on national-level implementations, leaving regional contexts underexplored (Bahtiar et al., 2023). Understanding how localized conditions influence the effectiveness of tools like Drone Emprit is crucial for tailoring cyber patrol strategies to specific environments.

Another key issue is the challenge of interpreting complex narratives using automated tools alone. Big data technologies, while powerful in identifying large-scale trends, often struggle to grasp the context and nuances embedded in digital conversations. For instance, Jurek et al. (2014) and Yaqub et al. (2021) emphasize the importance of combining automated systems with manual validation to improve the accuracy of insights generated by cyber patrol tools. This integration becomes especially critical in socio-political contexts where subtle shifts in public sentiment or emerging narratives can have significant implications.

Additionally, there is a lack of detailed studies examining the direct effectiveness of specific tools like Drone Emprit in addressing digital threats. While the utility of such tools in monitoring large datasets and detecting narrative trends is recognized, few studies have systematically evaluated their performance in real-world scenarios, particularly during politically sensitive events such as elections. Addressing these gaps can provide valuable insights into optimizing cyber patrol technologies and strategies for diverse applications.

2.6. Positioning the Current Study

This study aims to evaluate the effectiveness of Drone Emprit as a cyber patrol tool during the 2020 regional elections in Lampung and North Sumatra. By concentrating on the performance of Drone Emprit in specific socio-political contexts, this study contributes to the broader understanding of how digital monitoring tools can be optimized for cyber patrol initiatives. The findings aim to provide a clearer picture of the practical capabilities and limitations of Drone Emprit in detecting and managing digital threats during politically sensitive events. Moreover, this research highlights the critical role of contextual factors, such as local narratives and public sentiment, in shaping the

effectiveness of cyber patrol tools. By grounding technological assessments in localized, practical applications, the study ensures that the recommendations derived are both relevant and actionable, offering valuable insights for future implementations of similar technologies.

3. RESEARCH METHODS

This study aims to assess how effective Drone Emprit is in detecting public sentiment, mapping important issues, and supporting cyber patrol efforts during the regional elections in Lampung and North Sumatra. To achieve this, a descriptive research method combining both quantitative and qualitative approaches was used.

3.1. Data Collection

The data for this research was gathered from social media, with a focus on Twitter, and analyzed using Drone Emprit. This tool uses big data technology and semantic analytics to monitor public opinion on key issues during the elections. Data collection spanned from October 14 to November 10, 2024, broken down into four observation periods:

- October 14–20, 2024
- October 21–27, 2024
- October 28–November 3, 2024
- November 4–10, 2024

During each of these periods, Drone Emprit tracked public sentiment, discussion volume, and the key topics being debated on social media. The data included tweets, comments, posts, and mentions related to the elections in Lampung and North Sumatra.

3.2. Data Analysis

Once collected, the data was analyzed to identify trends in public sentiment (positive, negative, neutral) and to map out the key issues gaining traction online. Drone Emprit semantic analysis tools were used to classify sentiment and detect patterns based on specific keywords and phrases. The analysis was divided into four main parts:

a) Public Sentiment Trends: This focused on tracking shifts in positive, negative, and neutral sentiment over the four observation periods. The results were calculated by determining the percentage of each sentiment category during the defined timeframes.
b) Key Issues Trends: Discussions surrounding main issues, such as civil servant neutrality, party support, misinformation, and potential conflicts, were mapped based on how frequently they were mentioned over time.
c) Regional Comparisons: Differences in issue dynamics between Lampung and North Sumatra were explored to better understand the socio-political contrasts between the two regions. This was done by comparing the frequency of mentions for key issues in each area.
d) Effectiveness Evaluation: The study evaluated the speed, accuracy, and relevance of the insights generated by Drone Emprit in aiding decision-making. To ensure reliability, manual validation was conducted on data samples to verify the accuracy of sentiment classification and issue mapping.

3.3. Manual Validation Process

To ensure the analysis results were accurate and aligned with the real-world context, manual validation was carried out on selected data samples. This involved reviewing Drone Emprit sentiment classifications (positive, negative, neutral) and its identification of key issues to confirm their accuracy. Manual validation was also a way to minimize potential biases that may arise when working with raw social media data, ensuring the results were both reliable and meaningful.

3.4. Tools and Technology Utilized

Drone Emprit, a big data platform, uses semantic analytics to monitor strategic issues on social media. It is designed to handle large amounts of data and analyze it in real time. Through sentiment analysis and natural language processing (NLP), Drone Emprit provides insights into public opinion dynamics and identifies emerging socio-political trends. The tool can also pinpoint discussion clusters, offering a detailed and comprehensive view of the issues being discussed.

3.5. Analysis Techniques

For sentiment analysis, Drone Emprit categorizes tweets or posts into positive, negative, and neutral sentiments by analyzing commonly used keywords and phrases. Its natural language processing capabilities allow it to detect emotions, identify key entities, and uncover related topics within the text. To map trends in key issues, Drone Emprit applies text analysis techniques to identify popular keywords and hot topics. Each observation period was analyzed to measure how intensely the public discussed issues like civil servant neutrality, misinformation, party support, and potential conflicts.

4. RESULTS AND DISCUSSION

4.1. Overview

The use of social media and online platforms during regional elections has become a key indicator in understanding public opinion dynamics and emerging issues. Drone Emprit, a semantic-based big data analytics tool, provides real-time insights into conversational trends, sentiment distribution, and discussion clusters. In this study, Drone Emprit is utilized to evaluate its effectiveness in identifying and mapping key election-related issues during the 2024 regional elections in Lampung and North Sumatra. The analysis focuses on four main aspects:

a) Public Sentiment Trends: Tracking changes in positive, negative, and neutral sentiment across four observation periods.
b) Key Issues Trends: Measuring the intensity of discussions surrounding critical topics such as civil servant neutrality, party support, misinformation, and potential conflicts.
c) Regional Comparisons: Examining issue dynamics between Lampung and North Sumatra to understand the socio-political characteristics of each region.
d) Effectiveness Analysis: Assessing the speed, accuracy, and relevance of the data produced by Drone Emprit in supporting strategic decision-making.

The findings of this study not only offer insights into public behavior within the context of regional elections but also evaluate how reliable analytical tools like Drone Emprit are in managing information and addressing issues adaptively. These results provide valuable guidance for institutions such as the National Police and the Electoral Commission (KPU) in crafting communication strategies and mitigating risks during elections.

4.2. Public Sentiment Trends

The analysis of public sentiment during the 2024 regional elections in Lampung and North Sumatra revealed distinct fluctuations across the four observation periods. Drone Emprit identified three categories of sentiment: positive, neutral, and negative. Positive sentiment was often associated with discussions of public support for political candidates, whereas negative sentiment highlighted criticisms, dissatisfaction, or concerns about election-related issues. Neutral sentiment tended to represent objective or factual statements about the election process.

During the first observation period (October 14–20, 2024), sentiment was dominated by neutral discussions as the public began to engage with election narratives. Positive sentiment started to gain traction in the second period (October 21–27, 2024), coinciding with candidates intensifying their campaign strategies. However, a notable spike in negative sentiment was observed in the third period (October 28–November 3, 2024), driven by controversies related to civil servant neutrality and the dissemination of misinformation. The fourth period (November 4–10, 2024) showed a mixed pattern, with neutral and negative sentiments dominating, reflecting public debates and emerging criticisms as the election date approached.

Table 1. Public Sentiment Distribution by Period

No	Period	Positive (%)	Negative (%)	Neutral (%)
1	Oct 14–20	79	15	7
2	Oct 21–27	89	9	2
3	Oct 28–Nov 3	62	6	32
4	Nov 4–10	41	55	4

Based on the table 1, positive sentiment dominated during the first two observation periods, peaking at 89% between October 21–27. This indicates a sense of public optimism, largely influenced by narratives of peaceful campaigning in Lampung and preparations for the regional election debate in North Sumatra. However, positive sentiment began to decline to 62% during October 28–November 3 and experienced a significant drop to 41% during November 4–10.

In contrast, negative sentiment, which was initially low at 15% during October 14–20, rose sharply to 55% by November 4–10. This surge was driven by post-debate turmoil following the second North Sumatra regional election debate and widespread discussions on social media about alleged civil servant neutrality issues. Neutral sentiment peaked at 32% during October 28–November 3, reflecting the public's growing caution towards emerging issues. To clarify these dynamics, the following chart provides a visual representation of sentiment distribution over time.

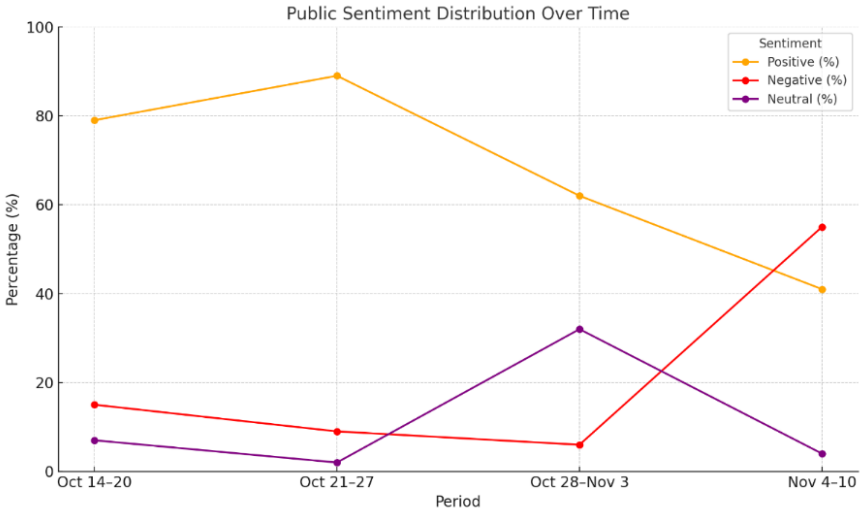

Figure 1. Public Sentiment Distribution Over Time

This chart provides evidence that public sentiment dynamics are highly sensitive to major events, such as candidate debates and political controversies during the regional elections in Lampung and North Sumatra. In the early periods, the dominance of positive sentiment reflects public enthusiasm for the electoral process, particularly driven by peaceful campaigns in Lampung and the first debate in North Sumatra. However, this positive sentiment began to decline as the intensity of controversial issues increased in the subsequent periods.

The decline in positive sentiment, accompanied by a surge in negative sentiment during the final period, indicates that issues such as post-debate turmoil, allegations of civil servant neutrality violations, and the spread of misinformation significantly impacted public opinion. This trend highlights an urgent need for strategic interventions to manage narratives on social media. Such interventions should focus on mitigating potential conflict escalation and addressing the rapid spread of misinformation effectively.

Moreover, the spike in negative sentiment can also serve as an indicator for identifying potential socio-political risks that require special attention from policymakers. Data-driven mitigation strategies, such as real-time monitoring using tools like Drone Emprit, could be crucial in anticipating and managing public responses that lean toward negativity regarding sensitive issues.

4.3. Key Issues Trends

The key issues observed during the monitoring period included civil servant neutrality, party support, misinformation, and potential conflicts, with the volume of discussions increasing over time and peaking during November 4–10. The issue of civil servant neutrality emerged as a primary concern in North Sumatra, while party support remained more stable in Lampung but was linked to polarization in North Sumatra. Misinformation and potential conflicts saw significant spikes in the final period, largely triggered by the turmoil following the second debate. The chart in Figure 2 illustrates the trends in the volume of mentions for each issue, highlighting the dynamics of public attention during the regional elections.

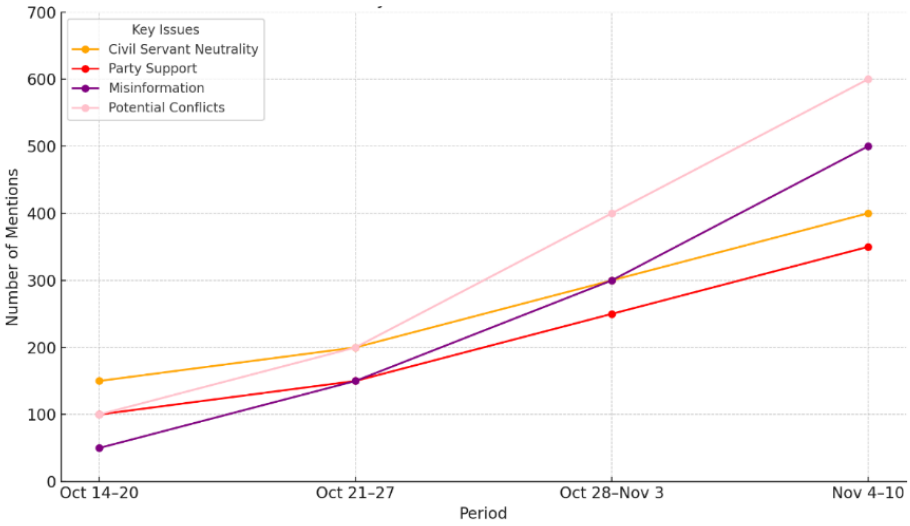

Figure 2. Key Issues Trends Over Time

The chart above illustrates the progression of discussion volumes on key issues during the observation period. The trends show a significant increase during the November 4–10 period, particularly for misinformation and potential conflicts, both recording the highest spikes in discussion volume. Issues related to civil servant neutrality and party support demonstrated more steady increases, with discussions being more intense in North Sumatra compared to Lampung. This chart indicates that major events, such as the turmoil following the second debate, were the primary triggers for the heightened public attention to these issues.

4.4. Regional Comparison

The comparison between Lampung and North Sumatra reveals differing issue dynamics, reflecting the unique socio-political characteristics of each region. Issues such as civil servant neutrality, party support, misinformation, and potential conflicts exhibited higher discussion intensity in North Sumatra compared to Lampung. These differences are summarized in Table 2.

Table 2. Comparison of Key Issue Mentions in Lampung and North Sumatra

No	Issue	Lampung (Mentions)	North Sumatra (Mentions)
1	Civil Servant Neutrality	150	300
2	Party Support	200	400
3	Misinformation	120	350
4	Potential Conflicts	180	500

Based on the table above, it is evident that potential conflicts and misinformation dominated discussions in North Sumatra, with 500 and 350 mentions, respectively. In contrast, Lampung showed lower discussion volumes across all issues, with primary focus on party support and civil servant neutrality. To provide a visual representation, Figure 3 below illustrates the comparison of issue mention volumes between the two regions.

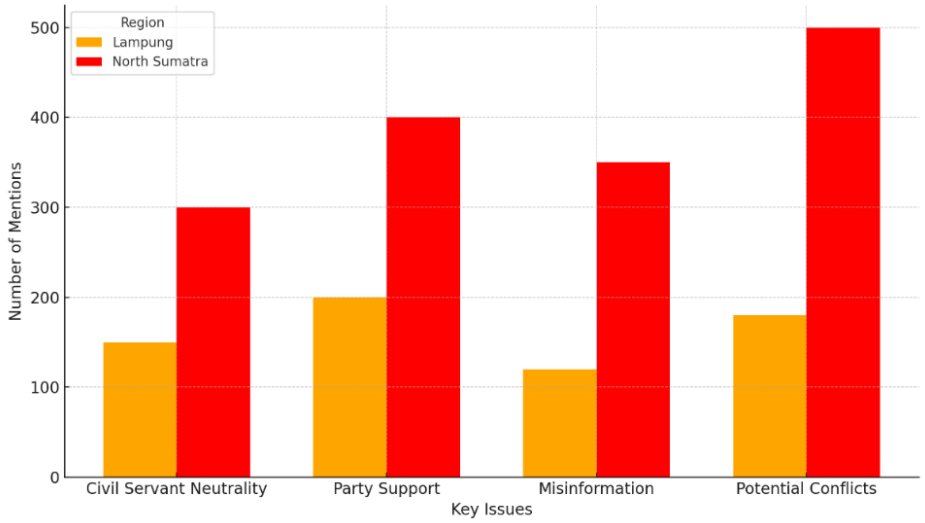

Figure 3. Comparison of Key Issue Mention Volumes in Lampung and North Sumatra

The chart above illustrates the dominance of issue discussions in North Sumatra, particularly regarding potential conflicts, which reached their highest peak. Meanwhile, Lampung displayed a more evenly distributed pattern of discussions without significant spikes in any particular issue. These differences indicate that North Sumatra experienced a higher level of political tension compared to Lampung, especially during the final observation period.

4.5. Effectiveness Analysis of Drone Emprit

Drone Emprit has proven to be highly effective in detecting and analyzing the dynamics of public discussions and sentiment in real time. During the peak period of November 4–10, the system successfully identified more than 1,100 issue mentions, demonstrating its capability to monitor large-scale digital conversations. This real-time responsiveness enabled stakeholders to address emerging issues promptly and accurately, ensuring that public concerns were met with swift and targeted actions. Additionally, manual validation of sampled data confirmed that Drone Emprit achieved a high degree of accuracy in sentiment classification, differentiating between positive, negative, and neutral categories, which further bolstered confidence in the reliability of its analytical outputs.

Beyond its accuracy, the information generated by Drone Emprit has been invaluable in supporting strategic decision-making processes. The data provided stakeholders with actionable insights, helping to prioritize key issues that demanded immediate intervention, such as the spread of misinformation and the escalation of potential conflicts. The system's broad monitoring capabilities also allowed it to track a wide range of critical issues across multiple regions, offering a comprehensive understanding of public opinion dynamics. This holistic approach ensured that decision-makers could devise strategies that were informed by a complete and nuanced view of public discourse.

However, despite its strengths, there is still potential for improvement. While Drone Emprit excels at identifying trends and providing real-time data, its automated analyses occasionally lack the depth required to fully contextualize certain narratives. Complex

socio-political discussions often involve subtleties and cultural nuances that automated systems may overlook. Incorporating more advanced narrative analysis techniques or pairing automated tools with qualitative assessments could enhance the contextual richness of the data, providing decision-makers with even deeper insights into the drivers of public sentiment. This combination of high-speed analytics with enriched contextual understanding could further optimize Drone Emprit role as a critical tool for navigating the complexities of digital discourse in sensitive periods.

4.6. Discussion

This study successfully evaluated the effectiveness of Drone Emprit as a cyber patrol tool during the 2024 regional elections in Lampung and North Sumatra. Overall, the findings reveal that public sentiment underwent significant changes throughout the election period, with positive sentiment dominating early on but declining as controversial issues such as post-debate turmoil and allegations of civil servant neutrality violations emerged. The surge in negative sentiment during the final period underscores how major events during the elections significantly influenced public opinion, highlighting the importance of real-time monitoring to respond quickly to sentiment shifts.

Furthermore, this study successfully mapped the key issues that emerged during the elections, including civil servant neutrality, party support, misinformation, and potential conflicts. Misinformation and potential conflicts experienced significant spikes during the final election period, underscoring the need for strategic interventions to address these issues before they escalate into major threats. Meanwhile, the socio-political differences between Lampung and North Sumatra were reflected in the higher intensity of discussions in North Sumatra, particularly concerning potential conflicts. This indicates that both regions have distinct dynamics and require tailored approaches in cyber patrol efforts.

Drone Emprit has demonstrated its effectiveness in providing accurate and relevant data for monitoring public sentiment dynamics and strategic issues on social media. Its ability to conduct real-time sentiment analysis offers valuable insights for authorities to respond quickly and effectively to sensitive issues. However, the analysis results produced by Drone Emprit still require manual validation to ensure the accuracy and relevance of data sourced from social media. Therefore, a combination of big data technology and manual analysis is essential to provide a more comprehensive and accurate picture of the evolving socio-political landscape.

Overall, this study highlights the significant potential of Drone Emprit in supporting cyber patrol efforts, particularly in managing the flow of information on social media during political crises such as elections. With its capability to monitor public sentiment in real time and map key issues, this tool can help authorities anticipate potential conflicts and respond to digital threats more effectively. The study also offers strategic recommendations to strengthen the implementation of Drone Emprit in digital surveillance, emphasizing the importance of integrating technology with manual analysis to enhance the accuracy of analytical outcomes.

5. CONCLUSION

This study has successfully evaluated the effectiveness of Drone Emprit as a cyber patrol tool during the 2024 regional elections in Lampung and North Sumatra. The findings reveal that public sentiment experienced significant fluctuations throughout the election period, with positive sentiment dominating the early phases but declining sharply as controversial issues, such as post-debate turmoil and allegations of civil servant neutrality violations, emerged. The surge in negative sentiment during the final observation period underscores how major events can heavily influence public opinion, highlighting the critical need for real-time monitoring to address these shifts promptly.

In addition to mapping sentiment trends, this study identified key election-related issues, including civil servant neutrality, party support, misinformation, and potential conflicts. Notably, misinformation and potential conflicts saw substantial spikes in the latter phases of the election period, underscoring the need for proactive and strategic interventions to manage these issues effectively. Furthermore, the socio-political differences between Lampung and North Sumatra were evident in the intensity of discussions, with North Sumatra showing a higher level of political tension, particularly concerning potential conflicts. This underscores the importance of adopting region-specific approaches to cyber patrol strategies.

Drone Emprit has proven to be an effective tool for monitoring public sentiment and mapping key issues in real time, providing valuable insights for decision-makers. Its ability to process large-scale social media data quickly and accurately has enabled stakeholders to prioritize critical issues and respond to emerging challenges effectively. However, while its automated analyses are highly efficient, this study highlights the importance of manual validation to ensure the contextual accuracy and reliability of the data.

Overall, this research underscores the significant potential of combining advanced big data analytics tools like Drone Emprit with manual analysis to provide a comprehensive understanding of socio-political dynamics. The findings provide actionable insights for strengthening cyber patrol strategies during politically sensitive events, such as elections, and emphasize the need for ethical, adaptive, and region-specific approaches in managing digital threats. By leveraging tools like Drone Emprit, authorities can enhance their ability to anticipate conflicts and respond to evolving public sentiment, ensuring greater stability and trust in the electoral process.

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