EXPLORING THE EMOTIONAL LANDSCAPE OF THE MONTENEGRO PRESIDENTIAL ELECTION: A SENTIMENT AND THEMATIC ANALYSIS

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Original scientific paper
DOI: 10.31902/fll.50.2024.11
UDC: 342.843:[811.163.44'42:316.77]

Abstract: This paper presents an empirical analysis of the sentiment dynamics surrounding the 2023 presidential election in Montenegro, employing the VADER sentiment analysis tool to scrutinise text data from various media sources, including social media platforms such as Twitter, Facebook, and Instagram, over three distinct phases: pre-election, election day, and post-election, with validation using perplexity and coherence measures. The study systematically quantifies shifts in public sentiment, demonstrating how these fluctuations correlate with key electoral events. Pre-election analysis revealed a cautiously optimistic sentiment, with a slight predominance of positive over negative sentiments. On election day, sentiment polarised significantly, evidenced by increased negative and positive sentiments, reflecting heightened public engagement and anxiety. Post-election sentiment saw a marked decline in negativity and a rise in neutrality, suggesting a societal shift towards acceptance and reflection following the electoral outcome. This paper elucidates the complex emotional landscape of electoral processes and discusses the implications of these sentiment shifts in understanding democratic transitions. The findings highlight the potent role of public sentiment as both a reflection of and a response to political developments, offering insights into the broader socio-political repercussions of elections. Future research could extend these analyses to other electoral contexts to further refine our understanding of sentiment dynamics as predictors of political and social change.

Keywords: Sentiment Analysis; Presidential Election; Montenegro; VADER Tool; Public Engagement; Democratic Transitions; LDA

1. Introduction

In contemporary democratic societies, elections serve as pivotal moments that not only shape political landscapes but also reflect and

influence societal sentiments and aspirations. The Montenegrin presidential election of 2023 stands as a testament to this assertion. This research endeavours to dissect the intricate interplay between public sentiment and electoral processes through the lens of the VADER sentiment analysis tool, offering a comprehensive analysis of the emotional dynamics surrounding this significant electoral event. The outcome of this election not only determined the country's future leadership but also served as a barometer for the evolving democratic ethos in the region (Trastulli and Mastroianni, 2024). Amidst the fervent debates, campaign rhetoric, and media coverage that characterised the electoral landscape, understanding the sentiments of the electorate becomes paramount. Herein lies the utility of the VADER sentiment analysis tool, a computational tool widely used in natural language processing to gauge the emotional valence of textual data (Hutto and Gilbert, 2014). By harnessing this tool, we aim to unravel the emotional contours of the Montenegrin presidential election, delineating shifts in sentiment across distinct phases of the electoral process. This paper seeks to find the broader significance of sentiment analysis in the context of electoral politics, underscoring its relevance as a lens through which to comprehend the interactions between citizens, candidates, and the political landscape (Bansal and Srivastava, 2018). By analysing the emotional undercurrents that pervade electoral discourse, we endeavour to enrich our understanding of democratic transitions and their implications for societal cohesion and political stability. In this vein, the ensuing sections of this paper will offer a detailed exploration of the sentiment dynamics preceding, during, and following the Montenegrin presidential election of 2023.

2. Theoretical Foundations

The theoretical foundations of this study rests at the intersection of computational social science, natural language processing (NLP), and political communication research. Broadly, the approach to understanding public sentiment during elections is grounded in social constructivist views of political discourse (Bennett and Segerberg, 2013), wherein language on social media is seen as both reflecting and shaping collective perceptions. Within this framework, sentiment analysis emerges as a methodological tool to quantify affective dimensions in large corpora of text (Pang and Lee, 2008). From a theoretical standpoint, public sentiment can be conceptualised as a dynamic entity that reflects how individuals interpret political events, candidates, and outcomes. The “emotional contagion” theory suggests that emotional states can spread quickly across networks, especially on

platforms like Twitter or Facebook (Ferrara and Yang, 2015). This contagion effect is particularly salient in electoral contexts, where emotionally charged content—positive or negative—tends to garner disproportionate attention and engagement (Ceccobelli, 2018; Liao et al., 2018). Hence, observing sentiment fluctuations during an election can offer insights into collective perceptions of credibility, legitimacy, and political efficacy (Brader, 2006).

The study's use of VADER (Valence Aware Dictionary and sEntiment Reasoner) draws on a lexicon-based theoretical foundation, wherein a predefined dictionary assigns sentiment scores to words and phrases (Hutto and Gilbert). Such approaches assume that sentiment can be gleaned from the polarity (positive, negative, neutral) of words, modified by intensifiers or negations. An alternative theoretical track emphasises machine learning classification, where algorithms learn sentiment representations directly from labelled examples (Bansal and Srivastava, 2018). Both approaches aim to operationalise emotion-laden text into quantifiable metrics. Lexicon-based methods excel in interpretability—each term's sentiment contribution is transparent—while machine learning methods often achieve higher accuracy for domain-specific tasks but require substantial training data (Pang and Lee, 2008).

Alongside sentiment analysis, topic modelling contributes to the theoretical understanding of how ideas propagate and cluster in large discourse spaces. Latent Dirichlet Allocation (LDA) posits that each document (e.g., a social media post) is a probabilistic mixture of multiple topics, and each topic is represented by a distribution of words (Blei, Ng, and Jordan, 2003). Within political communication, LDA's underlying assumption aligns with agenda-setting theory, which posits that the salience of certain topics in media coverage influences public priorities (McCombs, 2005). By extracting latent themes in election-related content—such as alleged electoral misconduct or candidate credibility—we were able to trace how topics gain or lose prominence, thereby revealing the contours of public debate.

Lastly, the link between democratic processes and public sentiment is grounded in the idea that elections are not merely procedural events but transformative moments that can either solidify or challenge existing power structures (Huntington, 1991). In newer democracies or nations undergoing democratic consolidation—such as Montenegro—the emotional resonance of campaigns and elections may be amplified by historical legacies, social tensions, and expectations for political change (Trastulli and Mastroianni, 2024).

3. Literature Review

A growing body of work underscores the relevance of sentiment analysis in capturing public opinion during high-stakes political events. Multiple studies show that social media discourse can effectively forecast electoral outcomes or at least approximate shifts in voter sentiment over time (Bansal and Srivastava, 2018; Tumasjan et al., 2010). Although early research often relied on simple keyword frequency counts, more recent efforts employ sophisticated NLP methods—such as VADER—for fine-grained sentiment detection, especially suited for short, informal texts rife with slang and emojis (Hutto and Gilbert, 2014). Empirical findings across different democratic contexts point to sentiment polarisation on election day, wherein both highly positive and highly negative posts spike, reflecting intensified public emotions (Drus and Khalid, 2019). Prior scholarship has also noted the ephemeral nature of online political discourse: negative or positive bursts can be triggered by specific incidents, debates, or scandals, suggesting the need to track sentiment longitudinally across pre-election, election day, and post-election phases (Ceccobelli, 2018; Bansal and Srivastava, 2018). Whereas sentiment analysis focuses on emotional valence, topic modelling offers parallel insights into the substance of public conversation. Latent Dirichlet Allocation (LDA) remains a dominant technique due to its ability to handle large corpora and automatically discover thematic clusters (Blei et al., 2003). Recent research in political science and communication has successfully used LDA to map campaign narratives, detect coordinated misinformation, and explore evolving public agendas (Sherstinova et al., 2022). Moreover, studies that merge sentiment analysis with LDA highlight how each theme or topic can take on a distinct emotional profile (Alam and Yao, 2019). For instance, a “fraud allegations” topic might be predominantly negative, while a “hope for economic reform” topic might be predominantly positive. These dual-method approaches thus add granularity, enabling researchers to correlate specific themes—like candidate performances or policy proposals—with prevailing emotional tones (Drus and Khalid, 2019).

4. Research Questions and Hypothesis

This study is guided by three primary research questions aimed at understanding the sentiment dynamics surrounding the Montenegrin presidential election of 2023. Firstly, we seek to identify the dominant sentiment trends in public discourse across different phases of the election: pre-election, election day, and post-election. This involves analysing how sentiments fluctuate during these critical periods and

what emotional patterns emerge. Secondly, we aim to investigate how these sentiment trends correlate with key electoral events and outcomes, exploring whether significant political moments are reflected in shifts in public sentiment. Lastly, we examine the role of public sentiment in reflecting and potentially influencing political stability and societal cohesion during the electoral process. Understanding this dynamic can provide insights into the broader implications of sentiment on democratic transitions (Thelwall, 2022). Based on these research questions, we propose the following hypothesis:

Sentiment on election day will be significantly polarised, with notable increases in both positive and negative sentiments, indicating heightened public engagement and anxiety. This hypothesis is supported by the understanding that election day represents a high-stakes moment, where voters' emotions are intensely charged, resulting in a marked polarisation of sentiments.

By addressing these research questions and evaluating this hypothesis, our study aims to provide a comprehensive analysis of the emotional undercurrents that pervade electoral discourse, thereby enriching our understanding of the intricate relationship between public sentiment and political change. Through this investigation, we hope to illuminate the ways in which emotions can influence and reflect the broader socio-political context during significant democratic events.

5. Methodology

To empirically ground our exploration of emotional dynamics in the Montenegrin presidential election, we employ a methodological framework that accurately captures and analyses public sentiment. This section details the procedures and tools used for data collection, extraction, sentiment analysis, and thematic analysis. Our primary data sources include social media platforms such as Twitter, Facebook, and Instagram. These platforms were selected due to their widespread use and significant role in shaping and reflecting public opinion (Ceccobelli, 2018; Liao et al., 2018). The data collection spanned three distinct phases of the electoral process: pre-election (seven days before election day), election day, and post-election (seven days after election day). This timeframe allows for a comprehensive analysis of sentiment dynamics across the entire election period. To ensure reproducibility, we used specific keywords and hashtags to extract relevant social media posts in English related to the Montenegrin presidential election. The following keywords and hashtags were some of those we employed during the data extraction process:

Keywords: "Montenegro election," "presidential election," "Milo Đukanović," "Jakov Milatović," "DPS," "Europe Now Movement," "election results," "political change Montenegro," "election integrity."

Hashtags: #MontenegroElection, #Đukanović, #Milatović, #DPS, #EuropeNow, #ElectionResults, #PoliticalChange, #ElectionIntegrity.

Using the Parsel tool, we extracted text data from these platforms. Parsel is adept at navigating HTML and XML structures, enabling precise retrieval of user-generated content through XPath and CSS selectors. This targeted approach ensures the systematic collection of relevant textual data while maintaining the focus on public posts to adhere to ethical standards and privacy regulations. The data extraction process was designed to filter out irrelevant content and focus on posts directly related to the election, candidates, and key electoral events (Lotfi et al., 2022). Once the textual data was extracted, it underwent sentiment analysis using the VADER (Valence Aware Dictionary and sEntiment Reasoner) tool. VADER is optimised for social media text, capable of evaluating sentiment intensity by categorising text into positive, negative, and neutral sentiments. It also quantifies the intensity of these sentiments, providing a detailed understanding of the emotional valence of the text. VADER's lexicon-based approach assigns sentiment scores to individual words and aggregates these to determine the overall sentiment of a text. This method is particularly effective for analysing informal and colloquial language typical of social media posts, including handling emoticons, slang, and sarcasm. The sentiment scores were then averaged for each phase of the election to identify overall trends and shifts in public sentiment (Drus and Khalid, 2019). In compliance with ethical standards, our data collection focused exclusively on publicly available content written in English. The use of Parsel ensured that no private profiles or sensitive information were accessed. Anonymisation procedures were strictly followed to protect individual privacy. This approach aligns with ethical guidelines for social media research, emphasising transparency and respect for user privacy (Dwork, 2006).

All analyses were conducted within the Thonny IDE environment (Figure 1). Thonny was chosen for several reasons that align with the demands of scientific research and data analysis (Annamaa, 2015). Firstly, Thonny's user-friendly interface makes it an ideal choice for handling complex data processing tasks. Thonny's interface facilitates step-by-step debugging and allows for a clear visualisation of variables and their changes in real-time, which is critical for verifying the correctness of sentiment calculations and refining the analytical process. Secondly, Thonny's integrated support for Python and its

libraries is advantageous for implementing VADER. Python's ecosystem, including libraries such as *vaderSentiment* for sentiment analysis and *matplotlib* for visualisations, is well-supported in Thonny. This integration simplifies the execution of VADER's lexicon and rule-based algorithms directly on the corpus, allowing for efficient analysis of textual data from various sources. Furthermore, Thonny's capability to handle large datasets efficiently aligns with the requirements of this study, which involves analysing extensive social media data.

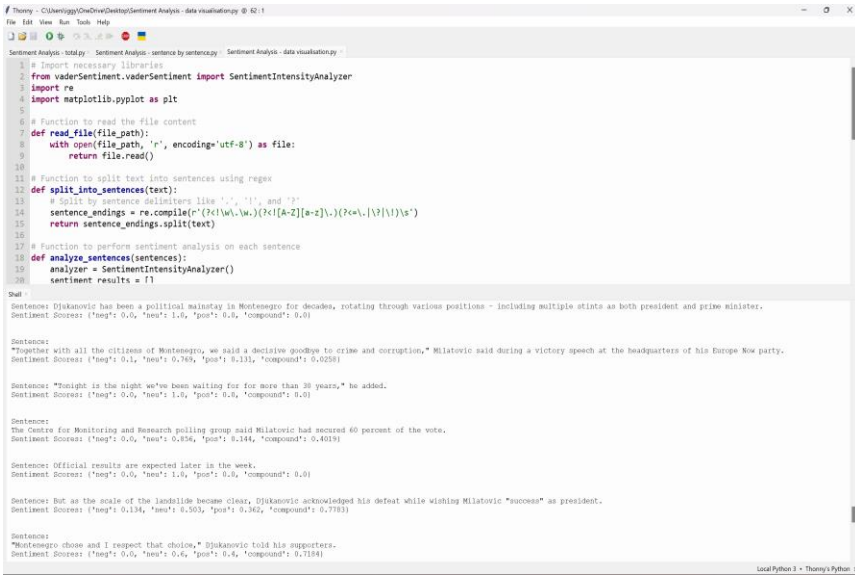


Figure 1. Thonny-powered sentiment analysis using VADER.

6. Statistical Analysis

In this section, we present the detailed statistical analysis conducted to evaluate the sentiment dynamics surrounding the Montenegrin presidential election of 2023. The analysis was segmented into three phases: pre-election, election day, and post-election, to capture the evolution of public sentiment over time.

In the week preceding the election, the sentiment analysis indicated a cautiously optimistic public demeanour. The data revealed a predominance of positive sentiment, quantified at an average of 0.3937, slightly surpassing negative sentiments, which registered at an average of 0.3621. The neutral sentiment was relatively low, averaging 0.1553, suggesting active engagement rather than ambivalence. The compound score of 0.0267 reflected this marginal positivity, indicating that a sizeable portion of the electorate harboured hopes for a favourable electoral outcome amidst extensive debates and media coverage.

The day of the election marked a notable shift in public sentiment. The volume and intensity of discussions increased significantly, as reflected by a rise in negative sentiment to an average of 0.5228. Positive sentiments were at an average of 0.4370, illustrating the polarised nature of public opinion and the high stakes perceived by the electorate. Neutral sentiment also increased to an average of 0.3921, indicating substantial uncertainty and deliberation among people. The compound score, now slightly negative at -0.0521, mirrored the heightened tension and apprehension that characterised the national mood as citizens cast their votes.

After the election results were declared, there was another significant transformation in the sentiment landscape. Negative sentiments dramatically decreased to an average of 0.0851, suggesting a de-escalation of electoral tension and a decline in contentious discourse. Conversely, neutral sentiments significantly increased to an average of 0.7955, indicating a period of collective reflection and emotional settling as the populace began to assimilate the election outcomes. Positive sentiments saw a modest rise to an average of 0.1193, reflecting tempered optimism about the new leadership's future direction. Correspondingly, the compound sentiment score improved markedly to 0.13335, signalling a readiness among the public to engage with and adapt to the forthcoming political phase (Figure 2).

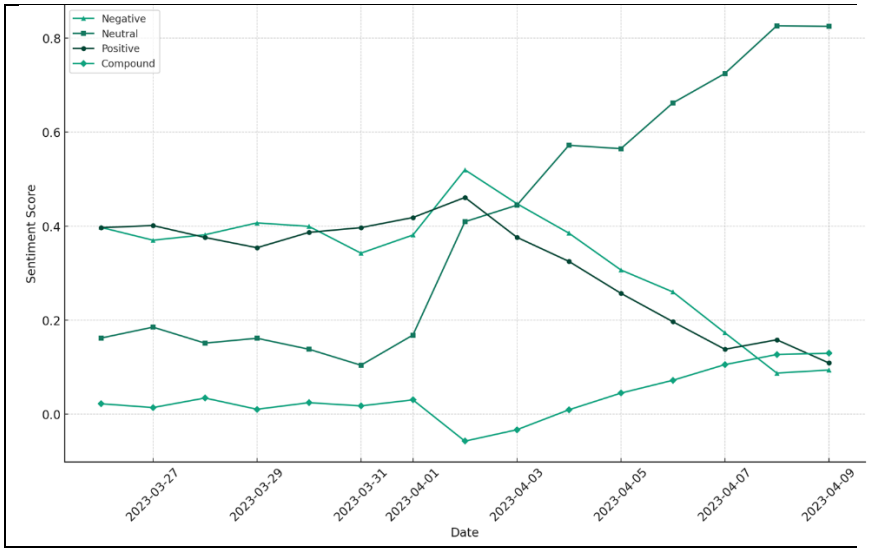


Figure 2. Detailed sentiment dynamics.

6.1 Correlation Analysis of Sentiment Dynamics

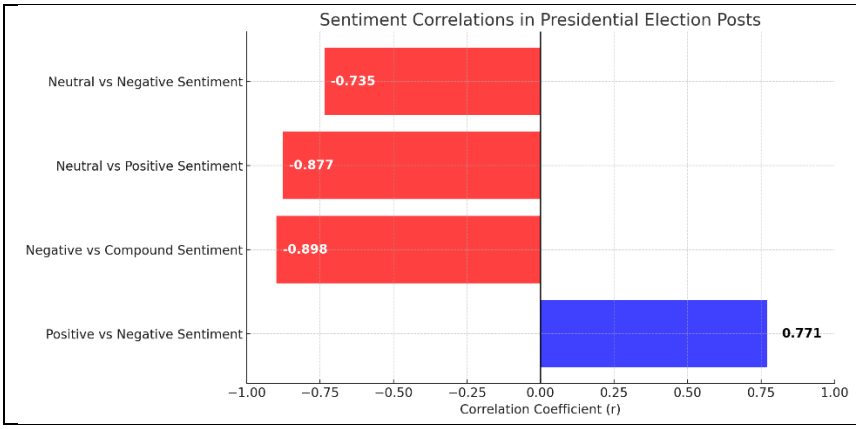
To establish the intricate relationships between various sentiment categories and the compound sentiment score, we undertook a comprehensive correlation analysis. This analysis aimed to uncover how these sentiment dimensions interact with one another during the electoral process.

Our analysis revealed a strong positive correlation (r = 0.771) between negative and positive sentiments. This indicates that as positive sentiment increases, negative sentiment also rises. This pattern reflects the polarised nature of election discussions, where positive posts about a candidate often provoke negative responses from opposing voters. Rather than a neutral balance, public discourse appears highly reactive, with engagement from both supporters and critics escalating in parallel.

There is a remarkably high negative correlation (r = -0.898) between negative sentiment and the compound sentiment score. This inverse relationship signifies that as negative sentiment escalates, the overall sentiment score—an aggregate measure of sentiment—becomes more negative. This finding highlights the dominant influence of negative sentiment in shaping the overall emotional tone of election-related discussions.

The correlation between neutral and positive sentiments is strongly negative (r = -0.877). This suggests that as neutral sentiment rises, positive sentiment declines, potentially indicating a shift away from clear partisan enthusiasm towards more moderate or uncertain discourse.

Similarly, a strong negative correlation (r = -0.735) exists between neutral and negative sentiments. This relationship implies that an increase in neutral sentiment is associated with a reduction in negative sentiment. As conversations shift toward neutrality, the expression of strong negative opinions diminishes, suggesting a less polarised and more balanced public dialogue (Figure 3).



6.2 LDA-based Thematic Analysis

Having established the statistical foundations of public sentiment dynamics through VADER analysis, it is crucial to analyse the thematic structures underlying these sentiments. To achieve this, we employ Latent Dirichlet Allocation (LDA), a sophisticated generative probabilistic model widely used in natural language processing. LDA enables us to systematically identify potential topics within the extensive datasets of social media text, thus providing a greater understanding of the themes that drive public discourse. This approach, complemented by a human-made thematic analysis, ensures a comprehensive exploration of the latent themes and their evolution throughout the electoral process. The LDA process begins with the preprocessing of text, including tasks like removing stop words, stemming, and lemmatisation. Following this, we define the expected number of topics and proceed to train the LDA model, which infers both the distribution of topics within each document and the distribution of words within each topic, revealing keywords that are statistically significant for each topic. After the computational topic identification via LDA, we engaged in a human-made thematic analysis to validate and expand upon these findings. This qualitative analysis starts with a thorough familiarisation with the data, where the corpus is analysed multiple times to identify significant patterns or themes that echo the topics suggested by LDA. Initial codes are then generated that align with these observations, and these codes are organised into potential themes. These themes are reviewed and refined, ensuring they accurately reflect the data, leading to a well-defined, coherent categorisation. The final phase involves detailing each theme with examples and integrating these insights into the broader context of the research question. Combining LDA with thematic analysis enhances our research methodology. While LDA offers a preliminary, quantitative inspection of topics based on word co-occurrence within the dataset, thematic analysis provides a deep, qualitative interpretation, ensuring a comprehensive analysis. This dual approach not only validates the computational findings with qualitative data but also enriches the understanding of the themes by exploring them in detail. Achieving saturation in thematic analysis confirms that all relevant data is considered, offering a profound and extensive insight into the themes prevalent in social media discussions related to our study.

To quantify the quality of our LDA model, we calculated the perplexity using the test set of our corpus. The perplexity score was approximately 12.18, indicating a good fit of the model to the data. This low perplexity value suggests that the LDA model effectively captured

the underlying thematic structure of the corpus, providing a reliable basis for our thematic analysis. In addition to perplexity, we assessed the interpretability of the topics using the C_V coherence measure. The coherence scores were calculated for different numbers of topics, and the highest coherence was achieved with six topics. This optimal number of topics provided a balance between statistical reliability and meaningful interpretability, ensuring that the identified themes were both coherent and relevant. The identified themes were:

1. Political Change and Elections: related to the electoral process, results, and shifts in power dynamics.
2. Political Figures: key individuals involved in the political narrative, particularly Milo Đukanović and Jakov Milatović.
3. Political Parties and Movements: discussion around political entities such as the Democratic Party of Socialists and the Europe Now Movement.
4. Voter Engagement and Turnout: statistics and significance of voter participation in the elections.
5. Allegations and Electoral Integrity: controversies and challenges during the elections, including irregularities and actions of political actors.
6. Sociopolitical Context and Historical Background: broader context of Montenegro's political history and its impact on current events.

Theme	Keywords
Political Change and Elections	presidential elections, votes, run-off, results, defeat, winner
Political Figures	Đukanović, Milatović, incumbent, candidate, leader, President, Prime Minister
Political Parties and Movements	party, movement, coalition, Democratic Party of Socialists, Europe Now Movement
Voter Engagement and Turnout	turnout, eligible voters, first round, second round, participation, mobilisation

Theme	Keywords
Allegations and Electoral Integrity	irregularities, polling stations, threats, ballot papers, voter pressure
Sociopolitical Context and Historical Background	longest-serving, historical, transition, independence, political history

Table 1. Key Themes and Associated Keywords.

By carefully selecting the number of topics based on coherence scores and validating the results through manual inspection, we ensured that the LDA model provided a comprehensive and interpretable thematic structure for our analysis of the sentiment dynamics surrounding the Montenegrin presidential election. This methodological rigour enhances the reliability and validity of our findings, offering deeper insights into the themes within this social media discourse.

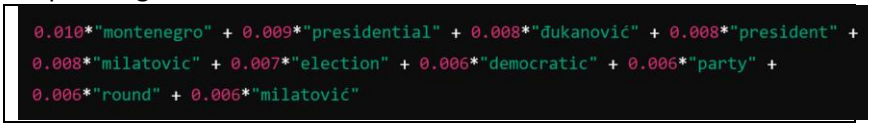


Figure 4. LDA analysis interface

In the Latent Dirichlet Allocation (LDA) model, each topic is represented by a set of words, each assigned a specific weight. For instance, as shown is Figure 4, the notation 0.010*"Montenegro" indicates that the term "Montenegro" has a weight of 0.010 in the given topic. The weight, also referred to as the probability or importance score, quantifies the relevance of the term within the context of the topic. Higher weights suggest greater importance and stronger association with the topic. The words with their associated weights collectively characterise the topic, providing insights into the themes present in the corpus. By examining the weights, we were able to determine which terms are most indicative of a topic, allowing for a structured interpretation of the data. Following closely, the word "presidential" with a weight of 0.009 emphasises the focus on the presidential nature of the elections. This term is key in framing the specific type of political event under scrutiny, distinguishing it from other electoral processes such as parliamentary or local elections. Names of prominent political figures like "Đukanović" and "Milatović" each have a weight of 0.008, signifying their pivotal roles in the narrative. Milo Đukanović, the long-standing leader and former president, and Jakov Milatović, his

challenger and the eventual victor, are central to the electoral storyline. These names are associated with various discussions around their campaigns, policies, and public perceptions. The term "president," also weighted at 0.008, reflects discussions about the office itself, its significance, and the transition of power. The word "election," with a weight of 0.007, encapsulates the broader electoral process, including voting, campaigning, and results. It signifies the general focus on the mechanisms and outcomes of the democratic process. Words like "democratic" (0.006), and "party" (0.006) shed light on the political entities involved and the democratic framework within which the elections were conducted. These terms point to discussions around party politics, democratic values, and the organisational aspects of the elections. By examining the weights associated with each term, we can understand the central themes and the importance of various elements such as political figures, electoral processes, and party dynamics (Figure 5).

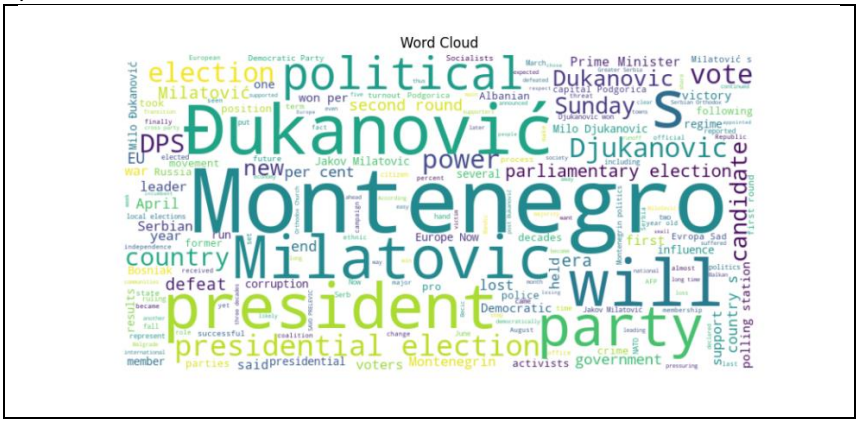


Figure 5. Word cloud showing the prevalent terms.

6.3 Human-based Thematic Analysis

To complement this data-driven “machine” approach, we also conducted a “human-powered” thematic analysis. A team of trained coders systematically reviewed the dataset, identifying overarching themes that captured key aspects of election-related discussions. The coding process followed a structured approach: First, coders independently examined a subset of data to identify recurring patterns and key topics. Next, they engaged in a collaborative refinement process, discussing and consolidating their findings to ensure consistency and reliability in theme categorisation. The five themes identified through this thematic analysis are as follows:

1. Electoral Dynamics and Results: This theme encompasses discussions on the electoral mechanics and outcomes, emphasising the critical moments of the election such as the final counts and the declaration of the winner. Key terms include "election results," "final tally," "electoral victory," and "defeat."

2. Influential Political Figures: This theme centres on the prominent individuals shaping the political narrative of the elections, particularly focusing on their roles, policies, and public engagements. Keywords might include "leadership," "public appearances," "policy positions," and specific references to their political careers.

3. Political Party Strategies and Campaigns: This theme discusses the strategies deployed by various political parties and movements during the campaign, highlighting their approaches to gaining public support and managing their political images. Key terms could be "campaign strategies," "public relations," "political ads," and "party platforms."

04. Voter Participation and Electoral Engagement: Focused on the engagement levels of the electorate, this theme examines voter turnout, the mobilisation strategies of parties, and the overall enthusiasm in the voting process. Terms might include "voter mobilisation," "engagement strategies," "participation rates," and "voting incentives."

5. Electoral Fairness and Transparency: Covering the integrity and fairness of the electoral process, this theme investigates the measures taken to ensure a transparent election, along with any reports of malpractice or electoral fraud. Keywords could include "electoral fairness," "transparency measures," "fraud allegations," and "electoral oversight."

Both human-led thematic analysis and LDA-based computational analysis identified key aspects of the election discourse, particularly themes related to electoral outcomes, political figures, party strategies, voter engagement, and electoral integrity. However, the human analysis focused on conceptual and narrative-driven themes, such as Electoral Fairness and Transparency, which emphasised democratic principles and oversight. In contrast, the LDA approach captured broader, data-driven patterns, such as Sociopolitical Context and Historical Background, highlighting how historical narratives shape current political discussions—something human coders overlooked. Additionally, LDA categorised political figures and parties more explicitly (e.g., Milo Đukanović and Jakov Milatović), while the human analysis grouped them under Influential Political Figures. These differences

underscore the complementary strengths of both methods: human coders provide depth and contextual richness, while LDA excels in identifying hidden patterns across large datasets.

7. Discussion of the Results

This research combines quantitative sentiment analysis via the VADER tool and qualitative thematic insights from Latent Dirichlet Allocation (LDA) and human-made thematic analysis to provide a multi-dimensional perspective on the sentiment dynamics surrounding the Montenegrin presidential election of 2023. The integration of these approaches yields a comprehensive understanding of the complex emotional landscape associated with such pivotal democratic events.

The sentiment analysis revealed distinct emotional dynamics throughout the electoral timeline. Before the election, positive sentiment slightly exceeded negative sentiment, with a compound score indicating voter optimism amid debates and media coverage. On election day, discussions intensified, leading to a rise in negative sentiment, while positive sentiment remained steady, reflecting polarised opinions and high stakes. After the election results were announced, negative sentiment sharply decreased, and neutral sentiment significantly increased, indicating a period of reflection and emotional settling. Positive sentiment saw a modest rise, showing cautious optimism about the new leadership, and the compound sentiment score improved, indicating public readiness to adapt to the upcoming political phase.

Thematic analysis using Latent Dirichlet Allocation (LDA) and human-made thematic analysis identified key themes within the social media discourse. The primary themes included Political Change and Elections, focusing on the electoral process, results, and shifts in power dynamics; Political Figures, particularly highlighting Milo Đukanović and Jakov Milatovic; Political Parties and Movements, with discussions around entities like the Democratic Party of Socialists and the Europe Now Movement; Voter Engagement and Turnout, emphasising the statistics and significance of voter participation; Allegations and Electoral Integrity, covering controversies and challenges during the elections; and Sociopolitical Context and Historical Background, providing a broader context of Montenegro's political history and its impact on current events.

The findings from this study illuminate the sentiment dynamics of the Montenegrin election and offer broader insights into how emotions play a crucial role in democratic processes. Understanding these dynamics is vital for comprehending how public sentiment can influence

and be influenced by political developments. This understanding is particularly pertinent in the context of democratic transitions, where public sentiment can significantly impact the legitimacy and stability of governance. By integrating quantitative and qualitative analyses, our research provides a comprehensive view of the emotional landscape during the Montenegrin presidential election, contributing valuable insights into the interplay between public sentiment and political change.

8. Conclusions

This study has effectively demonstrated the dynamic interplay between public sentiment and political events during the Montenegrin presidential election by using a combination of VADER sentiment analysis and thematic analysis. The research illuminated how sentiments fluctuated significantly throughout the electoral phases, reflecting the collective emotional responses to political changes. The dual approach of computational and human analysis provided a comprehensive view, capturing both broad thematic trends and nuanced emotional undercurrents that define electoral politics. Our findings underscore the significant role of public sentiment in the electoral process. These insights contribute to a deeper understanding of the emotional landscape of democratic processes and highlight the importance of public sentiment in shaping and reflecting political developments.

However, several limitations of this study should be noted. The study primarily focused on text data from specific social media platforms, which may not fully represent the broader population's sentiments, especially those segments less active or entirely inactive online. Additionally, sentiment analysis tools like VADER, while effective, may not fully capture the subtleties of language nuances, idiomatic expressions, and cultural contexts that could influence sentiment interpretation. Additionally, our analysis was confined to a specific timeline surrounding the election, potentially overlooking longer-term sentiment trends before and after the immediate electoral period. Furthermore, the findings from this specific electoral context in Montenegro may not be directly applicable to other regions or electoral environments due to varying sociopolitical dynamics and media landscapes.

To build on the groundwork laid by this study, future research could explore several avenues. Expanding the temporal scope to include longer pre-election and post-election periods would provide a more comprehensive view of how sentiments evolve over the longer term and

how they stabilise or fluctuate following the conclusion of an election. Conducting similar sentiment analyses in different electoral contexts across various countries could help in understanding the universal versus culture-specific elements in electoral sentiment dynamics. Beyond textual data, incorporating multimodal data sources such as videos, images, and audio from social media could enrich the sentiment analysis, capturing a wider range of emotional expressions. Employing more sophisticated natural language processing (NLP) tools and machine learning models that can better handle sarcasm, irony, and complex emotional expressions would refine the analysis, enhancing our understanding of the nuanced interplay between public sentiment and electoral outcomes. By addressing these limitations and exploring these future research directions, we can continue to deepen our understanding of the role of public sentiment in democratic processes and its impact on political stability and societal cohesion.

The findings of this study have significant practical implications for policymakers and stakeholders in Montenegro, particularly in the context of managing and responding to public sentiment during elections. By systematically analysing sentiment dynamics, this research provides insights into how public emotions fluctuate across different phases of the electoral process. This understanding can be leveraged to improve electoral strategies, communication, and engagement with the electorate. Additionally, policymakers and political parties can use sentiment analysis to tailor their campaign strategies more effectively. By understanding the predominant sentiments of the electorate, campaign messages can be adjusted to address public concerns and aspirations more directly. For instance, the identified cautious optimism in the pre-election phase suggests a need for reinforcing positive messages of change and progress. The insights into sentiment polarisation on election day highlight the importance of transparent and effective communication. Stakeholders can use real-time sentiment data to address public anxieties and clarify any misinformation promptly. This proactive approach can help mitigate the spread of negative sentiments and foster a more informed electorate. The significant post-election increase in neutral sentiments indicates a period of reflection and adjustment. Policymakers can use this window to engage with the public on issues related to electoral integrity and transparency. By addressing concerns and demonstrating commitment to fair practices, trust in the democratic process can be reinforced.

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ISTRAŽIVANJE EMOCIONALNOG PEJZAŽA PREDSJEDNIČKIH IZBORA U CRNOJ GORI: ANALIZA SENTIMENTA I TEMATSKA ANALIZA

U našem radu smo koristili kombinaciju analize sentimenta pomoću VADER-a, kao i tematsku analizu pomoću ocjenjivača i algoritma Latent Dirichlet Allocation (LDA) za ispitivanje javnog mnjenja i tematskih oblasti tokom predsjedničkih izbora u Crnoj Gori 2023. godine. Podatke smo prikupili preko platformi Tviter, Fejsbuk i Instagram u tri faze: predizbornoj, na dan izbora i postizbornoj. VADER je korišćen za kvantifikaciju pozitivnih, negativnih i neutralnih sentimenata. Rezultati su pokazali oprezni optimizam prije izbora. Na dan izbora uočena je snažnija polarizacija, sa povećanjem i pozitivnih i negativnih emocija, što odražava pojačano uključivanje javnosti i dozu neizvjesnosti. Nakon objave izbornih rezultata, negativni sentiment je značajno opao, dok je neutralni osjetno porastao, što ukazuje na kolektivnu orijentaciju ka prihvatanju ishoda izbora. Analize korelacija i regresije potvrdile su snažan uticaj negativnog sentimenta na ukupni rezultat naše analize, što ukazuje na ključnu ulogu snažnih i javno iskazanih emocija tokom politički turbulentnih događaja. LDA-tematska analiza izdvojila je nekoliko glavnih tema, kao što su:

političke promjene, uloge kandidata i pitanja izbornog integriteta. Ove teme su nam, istovremeno, dale bolji uvid u širi društveno-politički kontekst. Naše istraživanje naglašava značaj analize sentimenta u smislu razumijevanja demokratskih procesa, naročito u zemljama u tranziciji, poput Crne Gore. Budući pravci istraživanja mogu da podrazumijevaju duže trajanje istraživanja i/ili analiziranje drugih (ne)političkih aktera radi preciznijeg utvrđivanja javnog sentimenta. Ovakav pristup može da doprinese oblikovanju izbornih strategija, što bi na kraju moglo da dovede do bolje transparentnosti u političkom životu.

Ključne riječi: predsjednički izbori 2023, analiza sentimenta, VADER, LDA, tematska analiza