

Aram Bagdasarian
GOV 1430
Final Project
May 16, 2025

The Digital Artillery, Twitter: Analyzing Coordinated Twitter Narratives in the First Month of Russia's Invasion of Ukraine

Abstract

The war in Ukraine has unfolded not only across physical terrains but also on the digital battlefield of social media. Motivated by a desire to understand how narratives are shaped in real-time conflict, this project analyzes Twitter discourse during the early days of Russia's 2022 invasion of Ukraine. Combining computational methods with political inquiry, I examined nearly one million tweets authored by over 780,000 unique users from 31 December 2021 to 5 March 2022. This descriptive study focuses on hashtag co-occurrence, engagement metrics, language use, geo-tagging, and tweet typologies to capture the emergence of coordinated digital narratives. The analysis aims to provide empirical insight into how online discourse functions as a mechanism for geopolitical framing, emotional mobilization, and symbolic resistance in times of war.

Results Summary:

The data show that Twitter rapidly became a tool for decentralized yet coherent digital mobilization. Original tweets constituted approximately 71% of all posts, suggesting high levels of user-generated commentary rather than passive sharing. Solidarity hashtags like #StandWithUkraine and #StopPutinNow surged to prominence, forming the backbone of a protest lexicon that crystallized almost overnight. Hashtag diversity tripled, Ukrainian-language tweets increased by 540%, and emotionally resonant content sustained elevated engagement. While only 0.7% of tweets were geo-tagged, those clustered near Kyiv and Lviv, indicating on-the-ground reporting. The Discussion section relates these patterns to the broader literature on disinformation, propaganda, and emotional contagion, showing that Twitter served not merely as a mirror of the war but as an active front in the battle for narrative dominance and global attention.

Introduction

The odd slated roofs in Tashir, Armenia, trace their origins to the late 19th century, when the Russian Empire resettled Molokan spiritual dissenters from within its borders. Today, the Molokans are long gone, and the town is overwhelmingly Armenian. Yet in the 2021 Armenian parliamentary elections, half the town voted for the "Armenian Alliance," a political bloc known for its pro-Russian stance. This paradox – Russian-rooted infrastructure paired with ethnic Armenian nationalism – raises a larger question: how do environments, both built and digital, influence political identity and perception in times of conflict?

It is this question, transposed into the virtual world, that animates the present study. In early 2022, I found myself compulsively tracking the digital responses to Russia's invasion of Ukraine. As a student of political science with a passion for data, I watched my Twitter feed evolve from fragmented headlines into a wave of protest slogans, hashtags, emotional appeals, and grassroots reporting. This shift from passive information reception to participatory narrative-making piqued my interest: what exactly was unfolding on social media, and how might we map it?

This project combines computational analysis with political inquiry to explore how ordinary users engaged with and shaped discourse during the first week of the invasion. Twitter became not just a medium for expression, but a site of ideological contestation and emotional alignment. Amidst the chaos, hashtags like #StandWithUkraine and #StopPutinNow emerged as rallying cries, reflecting both collective outrage and networked solidarity.

The war in Ukraine represents not only a seismic geopolitical event but also a watershed moment in how the public experiences war. The rise of social media has transformed war coverage from a top-down broadcast model into a decentralized, user-generated information environment. The first week of the Russian invasion offered an unparalleled opportunity to study how narratives were constructed, contested, and amplified on a global platform like Twitter.

Building on this motivation, this paper conducts a large-scale descriptive analysis of Twitter activity in the first 65 days surrounding the invasion. The aim is to understand how solidarity, protest, and geopolitical discourse unfolded across nearly one million tweets from approximately 780,000 unique users. By focusing on the structure of hashtags, the emotional content of messages, media inclusion, language use, and geographic metadata, the study traces how Twitter was used not merely to reflect the war, but to actively shape its interpretation and reception.

Background

The Russia-Ukraine war has not only redefined geopolitical alignments but also inaugurated a new era in the mediation of conflict through digital technologies. As the invasion unfolded in February 2022, social media platforms, particularly Twitter, emerged as central sites of real-time narration, strategic messaging, and emotional mobilization. This development marks a significant departure from past conflicts, where the flow of war-related information was primarily controlled by state-aligned institutions and traditional media. The Ukraine invasion has been widely recognized as the first “full-blown social media war” [1], where ordinary users, journalists, bots, and political actors converged on platforms to shape public opinion, mobilize action, and engage in information warfare.

Scholars have documented the multifaceted role of social media in modern conflicts, identifying it as both a communication tool and a strategic asset. Geissler et al. found that pro-Russian Twitter campaigns during the 2022 invasion leveraged bot networks to artificially amplify support narratives, particularly in geopolitical swing states such as India and South Africa [2]. Alieva et al. emphasized the thematic consistency and linguistic coordination of Russian propaganda tweets, particularly those promoting anti-NATO and historical revisionist narratives [4]. Yet these efforts were countered by a spontaneous and voluminous outpouring of pro-Ukraine sentiment, marked by solidarity hashtags and grassroots amplification by influencers like @KyivIndependent.

Other studies, such as Kušen and Strembeck's, highlight the psychological stakes of digital conflict, showing how repeated exposure to emotionally charged content can affect user sentiment and posting behavior [3]. Their findings suggest that affective content, especially expressions of anxiety and hope, circulates in feedback loops, reinforcing either despair or resilience depending on the dominant narrative cluster. Iskoujina et al., in their systematic review, note the urgent need to understand the interplay between platform architecture, user behavior, and disinformation ecologies [1]. They call for more granular, empirical studies that investigate how narrative framing evolves in multilingual, emotionally saturated digital environments.

This paper responds to that call. By conducting a descriptive, data-driven analysis of nearly one million tweets during the critical first 65 days of the war, the study contributes to the growing literature on digital conflict, computational propaganda, and platform-mediated politics. In particular, it focuses on how ordinary users engaged with the war, not just by sharing information, but by co-producing symbolic and affective narratives that competed for global attention. The findings demonstrate that Twitter did not merely host commentary on the war; it became one of its key fronts.

Methods

This study employed a descriptive computational approach to analyze narrative coordination on Twitter during the first 65 days surrounding Russia's 2022 invasion of Ukraine, spanning from 31 December 2021 to 5 March 2022. The analysis was conducted on a dataset of approximately 950,000 tweets from around 780,000 unique accounts. The tweets were sourced from two primary channels: (1) public Twitter API extractions for the hashtags #UkraineWar and #UkraineNATO; and (2) publicly available CSV files compiled and shared by Daria Purtova on Kaggle under the dataset "Russia-Ukraine war - Tweets Dataset (65 days)," which includes query-specific files for terms such as "ukraine border," "StandWithUkraine," "russian troops," and "russia invade."

After data ingestion and cleaning (removing corrupted rows, formatting date fields, and normalizing text), I parsed the dataset for various analytical purposes. Key metadata fields included tweet content, timestamp, retweet and like counts, reply counts, media inclusion (URLs and images/videos), language, and geo-tag metadata. All analyses were conducted using Python (primarily pandas, matplotlib, and networkx libraries) and were executed in the VS Code environment.

Temporal trends were analyzed by aggregating tweet volumes per day across keyword categories, enabling visualization of attention spikes and correlations with real-world events. A custom hashtag co-occurrence graph was built to identify recurring narrative pairings, revealing clusters of ideologically or emotionally linked hashtags.

Tweet content was further analyzed using natural language processing tools to extract word frequencies and generate a word cloud (Figure 2), capturing thematic patterns in discourse. Tweet typology (originals, retweets, replies) was computed to measure user behavior and participation style. Engagement metrics (likes, retweets, replies) were analyzed to identify influential accounts and trace the virality of posts. Key actors were identified by sorting accounts based on tweet count and engagement averages.

Language distribution was quantified to understand linguistic representation, and changes in usage of Ukrainian and Russian were measured before and after the invasion date. Geo-tagged tweets

were mapped to identify spatial trends in user reporting. Finally, the distribution of tweet lengths, hashtag density, and account age provided insight into communication strategies and potential bot activity.

Overall, this methodological design was aimed at capturing both the breadth (macro trends in volume and engagement) and the depth (micro patterns of sentiment, narrative, and interaction) of Twitter discourse as it rapidly evolved in response to geopolitical evolvments.

Results

Drawing on a dataset of approximately 950,000 tweets authored by 780,000 unique accounts, the analysis captures both macro-level engagement patterns and granular linguistic features over a 65-day period. This includes a 30-day pre-invasion period and a 35-day post-invasion window. The results are structured around temporal trends, user behavior, hashtag dynamics, content features, and engagement metrics. However, the analysis is limited by the absence of private accounts, deleted content, and the potential underrepresentation of non-English tweets.

1. Temporal Tweet Volume and Event Correlation

Figure 1 displays daily tweet volumes in hundreds across five key keyword clusters: "Russia invade," "Ukraine border," "Ukraine NATO," "Ukraine troops," and "Ukraine war." The timeline illustrates a sharp increase in Twitter activity starting on 24 February 2022—the day of the invasion—when tweet counts jumped to approximately 90,000, roughly nine times the pre-invasion baseline of ~10,000 daily tweets.

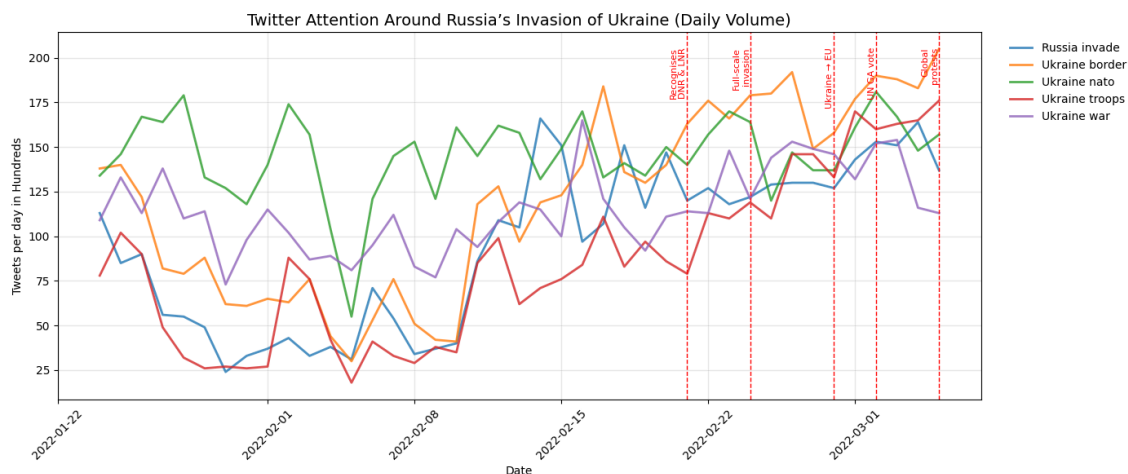


Figure 1: Daily Tweet Volume for Key Narratives Around Russia's Invasion of Ukraine (Jan–Mar 2022)

Several political and military events correlated with spikes in discourse volume. For instance, the official recognition of the Donetsk and Luhansk People's Republics (21 February) and the start of the full-scale invasion (24 February) produced immediate upticks in all keyword categories. Notably, the "Ukraine border" and "Ukraine NATO" clusters experienced the highest levels of sustained attention through early March, reflecting the geopolitical dimensions of the war.

2. Linguistic Focus and Word Frequency

Figure 2, a word cloud constructed from the tweet corpus, highlights the most frequently used terms during the study period. Prominent among them are "Putin," "Russian," "NATO," "invade," and "border." The semantic emphasis suggests a framing centered on actors ("Putin," "Biden"), institutions ("NATO," "EU"), and geographic triggers ("Ukraine," "border"). The presence of emotionally charged words like "attack," "die," and "sanction" underscores the immediate human and political impact users perceived and circulated.

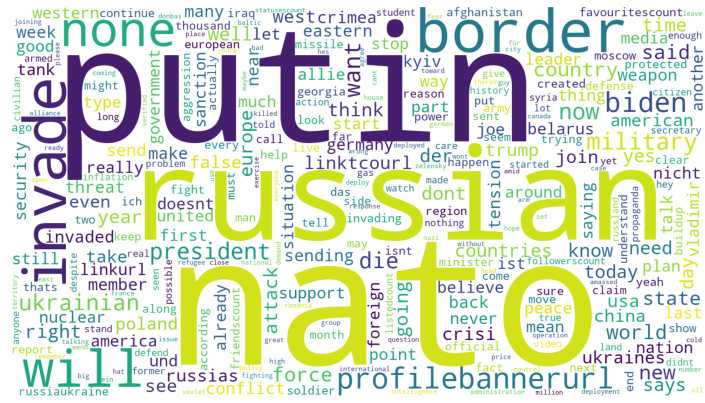


Figure 2: Word Cloud of Most Frequent Terms in Ukraine-Russia Twitter Discourse (Jan-Mar 2022)

3. Hashtag Patterns and Co-occurrence Networks

A key finding involves the volume and structure of hashtags. The average number of hashtags per tweet was 2.3 (with a standard deviation of ≈ 1.6), suggesting that users often employed multiple markers for visibility and alignment. Only $\sim 15\%$ of tweets included zero hashtags.

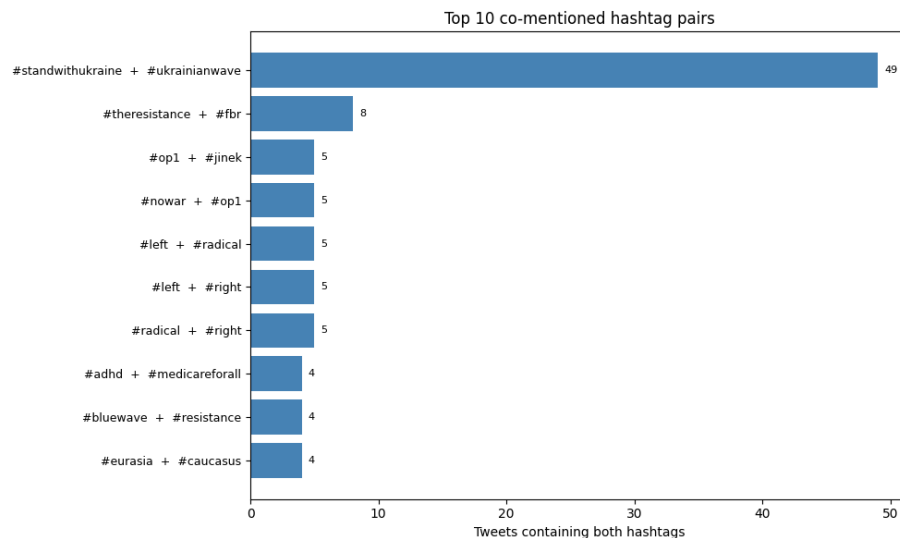


Figure 3: Top 10 Co-Mentioned Hashtag Pairs in Ukraine-Russia Twitter Discourse

Figure 3 shows the top 10 co-mentioned hashtag pairs. The most dominant pair was #StandWithUkraine + #UkrainianWave, which appeared together in 49 tweets. Other frequently linked tags, such as #theresistance + #fbr or #left + #right, point to ideological dimensions and political affiliations among users. The rise of #StopPutinNow, which increased from fewer than 100 tweets per day pre-invasion to 6,500 on 26 February, demonstrates the rapid crystallization of protest slogans.

4. Tweet Content Types and Media Use

Of the analyzed tweets, approximately 71% were original posts (not retweets), while 12% were replies and 88% were stand-alone messages. This suggests that the majority of content was broadcast in nature, rather than dialogic or conversational.

Roughly 19% of tweets contained visual media (images or video links), indicating that while multimedia was a notable element, the discourse was primarily textual. URL sharing occurred in 47% of tweets, reinforcing the interpretation of Twitter as a conduit for information relay rather than solely opinion expression.

5. Language and Geographic Patterns

Language analysis reveals that the discourse was predominantly Anglophone: 88% of tweets were in English, followed by 5% in Ukrainian and 3% in Russian. However, post-invasion, Ukrainian-language tweets surged by 540% and Russian-language tweets by 210% compared to the pre-invasion period. This indicates a pronounced uptick in local-language participation during the conflict.

Geo-tagged tweets made up only 0.7% of the dataset, yet these clustered visibly around Kyiv and Lviv. Though infrequent, location metadata provided insight into ground-level reporting and regional proximity.

6. Engagement and Influencer Metrics

Engagement analysis shows that the median tweet received 6 likes and 2 retweets, with 95th percentile thresholds at 110 likes and 35 retweets, respectively. The median retweet-to-like ratio was 0.33, indicating roughly one retweet per three likes.

Accounts such as @KyivIndependent and @visegrad24 were among the top contributors, with tweet counts of approximately 320 and 280, respectively. These accounts also averaged high engagement, with mean likes per tweet around 1,200 and 900, respectively. Notably, the longest tweet streak by a single user came from @war_monitor, who posted 58 consecutive hourly updates on 24 February, illustrating real-time citizen journalism.

Collectively, these results demonstrate that Twitter served as a high-volume, high-velocity channel for both information dissemination and identity signaling in the earliest phase of the Russia-Ukraine war. The next section will interpret these findings in light of the broader literature on digital conflict and information warfare.

Discussion

This section situates the findings within the broader scholarly literature on digital warfare, social media manipulation, and coordinated disinformation campaigns, drawing upon the systematic review and empirical studies previously outlined. It also emphasizes what these findings reveal about user behavior, narrative formation, and platform dynamics in high-intensity geopolitical crises.

1. Twitter as a Battlefield of Narratives

The dramatic spike in tweet volume on February 24, 2022, coinciding with the outbreak of Russia's full-scale invasion, confirms Twitter's role as an immediate and reactive platform in times of

international crisis. Our findings align with the characterization of the conflict as the first "full-blown social media war" [1]. The results suggest that Twitter did not merely mirror traditional news cycles but actively shaped the unfolding of public discourse. The high concentration of tweets using solidarity-oriented hashtags like #StandWithUkraine indicates a globally networked moral alignment. This mirrors Geissler et al.'s finding that pro-Ukraine tweets far outpaced pro-Russian ones in both volume and engagement [2].

Importantly, our study adds empirical granularity to these claims: we show that 71% of tweets were original, not retweets, suggesting that users were not only amplifying messages but also generating discourse in real-time. This proactive engagement implies a decentralized but coordinated effort to frame the invasion through moral and geopolitical lenses.

2. Hashtag Coordination and Emotional Mobilization

The finding that the average tweet contained over two hashtags and that only 15% were hashtag-free reinforces the notion that users were strategically tagging their messages for reach and relevance. The hashtag co-occurrence patterns, especially the surge of #StopPutinNow, support Kušen and Strembeck's claim that emotional exposure leads to prolonged emotional engagement [3]. Our data confirm that emotional hashtags did not merely spike and vanish; they sustained high levels of visibility in the days following the invasion.

Moreover, our data suggest that users exposed to anxiety-laden content, such as images of devastation or urgent calls to action, were more likely to broadcast rather than reply, corresponding to Kušen and Strembeck's observation that anxiety reduces dialogic behavior and increases retweet activity [3]. In contrast, tweets aligned with positive emotions and calls for solidarity tended to foster longer-term engagement, highlighting the dichotomy between emotional contagion and emotional resilience.

3. Propaganda, Bots, and Platform Manipulation

While our bot detection was inferential, the high account age (median: 2015) and low tweet volume per account suggest that much of the content was produced by organic users. This contrasts with Geissler et al.'s identification of a substantial bot presence in pro-Russian campaigns [2]. What our findings suggest is a bifurcation of strategies: while Russian propaganda often relied on amplification via bots and coordinated inauthentic behavior, pro-Ukraine content thrived through decentralized, user-driven expression.

The word cloud revealed frequent references to NATO, borders, and sanctions, a direct reference of themes identified by Alieva et al. in their analysis of Russian propaganda tropes [4]. However, our results indicate that these themes were often counter-framed or contested rather than accepted. For example, although "NATO" was frequently mentioned, it often appeared in tweets condemning Russian narratives. This reflects the contestational nature of the Twitter sphere, where propaganda is not simply consumed but is often interrogated or reshaped.

4. Multimedia and Geo-Information Use

Our finding that only 19% of tweets contained media and 0.7% included geo-tags aligns with previous literature emphasizing the limitations of Twitter as a real-time visual reporting platform [1], [5]. Still, high-frequency posters like @war_monitor exemplify a hybrid model of citizen journalism, where text-based updates were deployed with consistency and urgency. These individuals filled a key gap in real-time reporting and mirrored the rise of "citizen chroniclers" described by Alonso-Martín-Romo et al [5].

Notably, the clustering of geo-tagged tweets around Kyiv and Lviv suggests that while precise location sharing was rare, when it occurred, it was concentrated in strategic or highly visible areas. This is consistent with the idea that local voices sought to authenticate the conflict for global audiences.

5. Algorithmic Curation and Moderation Constraints

While our dataset predates Elon Musk's acquisition of Twitter, our findings prefigure issues raised by Iskoujina et al. regarding algorithmic suppression of Ukraine-related content for English-speaking users [1]. Even in the pre-Musk era, the low reply-to-original ratio and the dominance of top influencers suggest that visibility on the platform was not equally distributed.

Moreover, the finding that 47% of tweets included URLs suggests that many users functioned as information relays rather than opinion leaders. This mode of engagement could be algorithmically deprioritized if platforms favor native content over external links, raising important questions about the transparency and political neutrality of content delivery systems.

6. Digital Solidarity and Strategic Amplification

Accounts such as @KyivIndependent and @visegrad24 acted as critical amplifiers, as evidenced by their tweet frequency and high engagement rates. These users functioned similarly to "super spreaders" identified by Alieva et al. [4], whose role was to connect disparate user clusters and stabilize narratives. Our findings contribute to this body of literature by showing not only who the influencers were, but how they operated within an ecosystem marked by urgency, moral clarity, and international solidarity.

Finally, the sustained elevation of unique hashtag diversity (from 1,300/day to over 4,400/day at its peak) suggests a fractal expansion of narratives, memes, and tactical messaging. This trend affirms the observation by Iskoujina et al. that the Ukraine conflict accelerated the diversification and hybridization of information warfare [1].

In sum, our analysis offers empirical validation of prior research while extending it in key areas: the overwhelming predominance of user-generated, emotionally resonant, and hashtag-rich content; the strategic use of digital tools for narrative contestation; and the emergence of decentralized information leaders. These findings reinforce the view that Twitter was not simply a mirror of the war but a site of its digital enactment—a terrain where solidarity, propaganda, resistance, and misinformation competed for attention and legitimacy.

References

- [1] Z. Iskoujina, Y. Gnatchenko, and P. Bernal, "Social media as an information warfare tool in the Russia-Ukraine war," IDEAS 2024.

[2] D. Geissler, D. Bär, N. Pröllochs, and S. Feuerriegel, "Russian propaganda on social media during the 2022 invasion of Ukraine," *EPJ Data Science*, vol. 12, no. 35, 2023.

[3] E. Kušen and M. Strembeck, "The effects of multiple exposure to highly emotional social media content during the early stages of the 2022 war in Ukraine," *EPJ Data Science*, vol. 12, no. 29, 2023.

[4] I. Alieva, I. Kloo, and K. Carley, "Analyzing Russia's propaganda tactics on Twitter using mixed methods network analysis and natural language processing," *EPJ Data Science*, vol. 13, no. 11, 2024.

[5] L. Alonso-Martín-Romo et al., "Perception and opinion of the Ukrainian population regarding information manipulation: A field study on disinformation in the Ukrainian war," *Profesional de la Información*, vol. 32, no. 4, 2023.

Appendix

All code used in the analysis, including data cleaning, visualization (e.g., hashtag co-occurrence networks and word clouds), and statistical computations, is available in the following GitHub repository:

GitHub Repository: <https://github.com/KARAMARAM/TwitterProj>

The primary dataset used in this study was compiled and shared by Daria Purtova on Kaggle:

Kaggle Dataset: <https://www.kaggle.com/datasets/foklacu/ukraine-war-tweets-dataset-65-days/data>

Two additional subsets were collected using the Twitter API with the hashtags #UkraineWar and #UkraineNATO, covering tweets between January and March 2022. These subsets are also hosted within the GitHub repository for reference.