Ranah Research
Journal of Multidisciplinary Research and Development
E-ISSN: 2655-0865
082170743613 ranahresearch@gmail.com https://jurnal.ranahresearch.com
DINASTI RESEARCH

DOI: https://doi.org/10.38035/rrj.v7i3

Analysis of Communication Patterns and Social Networks in Digital Propaganda Against Zionism in the Palestine-Israel Conflict

Saniyah Nabila Fikriyah[1], Alila Pramiyanti[2]
[1] Telkom University, Bandung, Indonesia, saniyahnabilafikriyahh@gmail.com
[2] Telkom University, Bandung, Indonesia, alilapramiyanti@telkomuniversity.ac.id

Corresponding Author: saniyahnabilafikriyahh@gmail.com[1]

Abstract: The analysis of communication patterns and social networks in digital propaganda aims to understand the mechanisms of the spread and reception of these messages in various parts of the world. Research on digital propaganda on social media has identified a number of important patterns in the spread of messages. This research provides significant insights into the role of social media in shaping the dynamics of international conflict, as well as how digital propaganda can influence public perceptions of complex issues. Using the Social Network Analysis (SNA) method, this research enriches the theoretical understanding of how interactions between actors on platforms such as Twitter or X affect the spread of information and the formation of public opinion. This research also expands knowledge about SNA metrics such as degree centrality, which can be used to identify key actors in the spread of digital propaganda.

Keyword: communication, propaganda, social media, social network analysis, degree centrality

INTRODUCTION

Communication via digital media allows for multi-directional communication patterns, where information can flow vertically, horizontally and diagonally (Puspitosari & Lokananta, 2021). With the existence of social media platforms, every user can increase their search activity for various types of information, including information related to the Palestine-Israel conflict (Vis, 2013). The goal of a communication network is to understand how messages flow within the system, and how the actors within it interact with each other (Hapsari, 2016).

In 2023, X (formerly Twitter) became a platform for the dissemination of propaganda and commentary regarding the Israel-Palestine conflict. Users openly expressed their views on Israel's actions toward Palestinians, both historically and currently. The Oslo Peace Accords (1993), originally signed with the intention of ending the conflict, failed to materialize as a lasting solution, leading to an intensification of the conflict (Aswir et al., 2021). While this facilitates the spread of information, it also opens the door for misinformation and manipulation through propaganda. Therefore, a deeper analysis of the communication patterns on platforms

like Twitter is crucial to understanding the global public's perception of the conflict. Analysis of how users interact and share information on these platforms will provide a better understanding of how propaganda related to this conflict is perceived and shared among global audiences (Cervi & Marín-Lladó, 2022; Siapera et al., 2015).

This resistance often involves sharing images and updates of worldwide protests, boycotts, and criticisms of Israeli military actions. The patterns of communication are shaped by hashtags, memes, and educational content that emphasize Palestinian solidarity. The emergence of new media technologies has amplified propaganda related to the conflict, allowing for real-time information dissemination and shaping the public's view on the situation (Zahoor & Sadiq, 2021). With the existence of this social media platform, it is not only a communication and social networking tool but also a driver of significant social change (Weller, 2013).

X platform provides an opportunity for users to disseminate perspectives, particularly those opposing Zionism and critiquing Israel's policies. This widespread engagement with the issue through social media reflects the growing global discourse surrounding the conflict and highlights how propaganda is reshaping perceptions worldwide (Sholehkatin et al., 2024). To face the challenges of digital propaganda, collective efforts are needed from various parties, including individuals, organizations and governments (Yuan et al., 2023).

According to data from *Business of Apps*, the number of active X users reached 421 million in 2022, showing a growth of 4.99% compared to 2021. This surge is reflective of the increased use of social media platforms for political discourse, particularly during global conflicts. Figure 1 illustrates the annual growth in the number of X users from 2013 to 2023, providing a visual representation of how the platform's reach has expanded in recent years.

Figure 1. Annual Growth of X Users (2011-2023)
Source: Business of Apps

This figure shows the increasing number of active X (formerly Twitter) users, highlighting a notable surge from 312 million users in 2020 to 421 million in 2022. This growth underscores the platform's role as a key space for global communication, especially during international conflicts like the Israel-Palestine issue.

This study focuses on analyzing communication patterns and social networks formed around hashtags such as *#FreePalestine*, *#SaveGaza*, and *#IsraelPalestineWar*. By using Social Network Analysis (SNA), this research aims to explore how digital propaganda spreads across the platform, identifying key influencers and examining how their messages impact the global audience. Existing studies have yet to analyze how digital propaganda leverages network dynamics to shape international public opinion on the Palestine-Israel conflict. This study emphasizes the importance of understanding the mechanisms of social media in shaping the

narratives and public opinion about the Palestine-Israel conflict. Platform X serves as an effective tool for spreading propaganda through various formats, such as videos, images, and short messages, which significantly influences the global public's perception of the conflict (Jaramaya & Yolandha, 2023).

METHOD

Research Type

Several hashtags such as #FreePalestine, #SaveGaza, #IsraelPalestineWar, #AllEyesOnRafah, and #Julidfisabilillah shaped the narrative of the Palestine-Israel conflict and were spread in a dynamic and connected way. This study aims to explore the communication patterns that occurred on social media during this event and see how social networks were formed among the actors involved. The approach used in this study is Social Network Analysis (SNA), which allows the visualization and measurement of relationships and information flows between individuals, groups, or organizations in a network (Akbar et al., 2022; Prihantoro et al., 2021; Wasserman & Faust, 2009). The analysis is performed by calculating SNA metrics such as degree centrality to identify key actors in the communication network and existing communication patterns (Ledesma González et al., 2021). With degree centrality, this study found that several accounts often become the focal point in the spread of information and influence of opinion related to the Palestine-Israel conflict.

Network visualization was then performed using Google Colab to clarify the structure and dynamics of the social network. Analysis of these hashtags provides a deeper understanding of how information spreads, who the key actors are in spreading messages, and how public opinion is formed on the Twitter platform regarding the Palestine-Israel conflict.

Sample and Population

The data collection method in this study was carried out through data crawling techniques using the Python programming language run on Google Colab. The crawling process utilizes the Twitter API to gain access to the required data. This data collection was carried out using several relevant hashtags, namely #AllOnEyesRafah, #Julidfisabilillah, #FreePalestine, #SaveGaza, #IsraelPalestineWar, and others. These hashtags were chosen because they have strong relevance to the events that occurred during the Palestine-Israel conflict. These hashtags are often used by Twitter users to spread information, opinions, or propaganda related to the situation.

Analysis of these hashtags helps provide a deeper understanding of the spread of information, key actors in the spread of messages, and how public opinion is formed on the Twitter platform regarding the Palestine-Israel conflict.

Instruments

This research is inseparable from the Python programming language, which uses Tweepy to get the Twitter API that can collect many tweets according to requests, such as hashtags, users, etc. The output produced can be text, media, or other metadata that can support the data analysis process.

NetworkX is also used to help the process of visualizing and interpreting user relations, hashtags, and information that is spread. NetworkX facilitates the process of mapping community structures, identifying key actors, and seeing how information is spread in a network.

TextBlob and VADER are natural language processing tools used to analyze the tweets obtained, see existing sentiments, and things related to user narrative patterns when creating a tweet or communicating.

Research Techniques

This analysis of communication patterns provides insight into how digital information and propaganda about the Palestine-Israel conflict spreads on social media. Each type of communication creates a unique information pathway and contributes to the formation of public opinion and the intensity of the discussions that occur. The patterns also show how social media users use different types of interactions to spread narratives, strengthen opinions, or create broader conversations about the issues raised. Social Network Analysis (SNA) is used to map the relationships between users on social media X and identify the structures and communities that are formed.

The pattern of connections between nodes in the community shows interesting characteristics. Most of the direction of the connections (arrows) in the network flows from pro-Palestinian or pro-Israeli entities to neutral entities. This direction of the connections indicates an active effort by actors with pro-Palestinian or pro-Israeli affiliations to spread narratives, messages, or propaganda to users who are considered neutral. The purpose of these interactions is likely to influence the opinions or views of neutral users towards one party in the Palestine-Israel conflict.

RESULTS AND DISCUSSION

This chapter presents the results of research that has been conducted in accordance with the objectives and formulation of the problem. The discussion in this chapter includes an analysis of communication patterns on social media X, social networks identification, including key actors that related to digital propaganda in the Palestine-Israel conflict. The results of this study are expected to provide a comprehensive picture of how digital propaganda develops and operates on social media.

Through platforms like X, the conflict continues to gain attention and participation from a global audience, creating a digital space where narratives and propaganda can flourish and influence public perception globally. In this regard, the Palestine-Israel conflict has inspired various social movements that use digital platforms to voice their opinions and advocate for action.

One way to counter digital propaganda resistance is by increasing digital literacy. This certainly gives people the skills to transmit information critically. They will carefully select and sort out which news is true and which is not, so that disinformation will not occur.

SNA Implementation

In this study, the network formed from crawling data using the Twitter API consists of 6,207 nodes (users) and 6,583 edges (relationships between users). The overall network visualization can be seen in Figure 2 below, which shows the distribution of relationships and communities in the network.

Figure 2. Visualization of Network in X
Source: Research data

Through centrality analysis, such as degree centrality, key actors are found to have significant influence in spreading information and building narratives. These actors not only have extensive connections but also play an important role in connecting various users in the network.

In-Degree Centrality measures the number of connections received by a node. The node with the highest in-degree centrality value in each community indicates the actor who receives the most attention or messages from other users. The following table summarizes the actors with the best overall in-degree centrality:

Table 1. Overall Highest In-Degree Centrality

Username	Indegree Centrality	Affinity
IDF	0.033981	Netral
CIJ_ICJ	0.024272	Netral
Avolanza	0.024272	Pro-Palestina
Israel	0.019903	Netral
erlanishere	0.019417	Pro-Palestina

Besides, out-degree centrality measures the number of connections issued by a node. Nodes with the highest out-degree centrality values reflect the actors who are most active in sending messages or initiating interactions. The following table shows the actors with the best overall out-degree centrality:

Table 2. Overall Highest Out-Degree Centrality

Username	Outdegree Centrality	Affinity
AwiAdam2	0.027184	Pro-Palestina
abdisalamisma1	0.016019	Pro-Palestina
martosaeban	0.015534	Pro-Palestina
champbrb	0.013107	Pro-Palestina
ResourceProduc5	0.009223	Pro-Palestina

Next, the communities in the network are analyzed using the Louvain algorithm, which effectively groups users based on the intensity and frequency of their interactions. This algorithm identifies communities that are modularly interconnected. The network visualization shows a hierarchical structure, where key actors are often the main links between communities as shown on Figure 4 below.

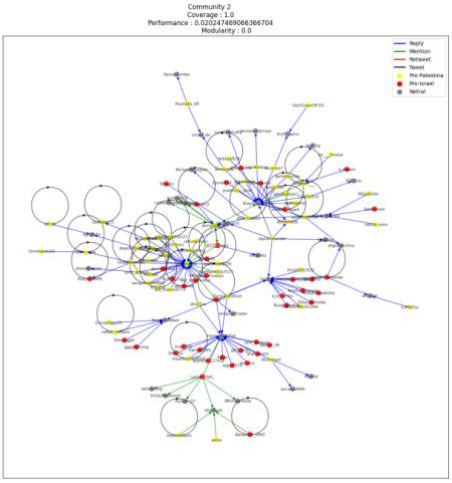

Figure 3. Community Visualization Sample of Louvain Algorithm
Source: Research data

The representation of X users in the form of nodes is grouped into several communities based on modularity. Each community is represented by a different color, reflecting the relationship of the intensity of interaction between the nodes within it. Although these

communities appear visually separate, the analysis results show that the communities do not exclusively represent a particular political or ideological viewpoint. In the same community, nodes were found with pro-Palestine, pro-Israel, and neutral viewpoints.

Key Actors Across the Affinities

Within the same community, nodes with pro-Palestine, pro-Israel, and neutral viewpoints were found. The existence of various entities with diverse viewpoints within the same community confirms that this network does not show absolute segregation based on political affiliation. Instead, it shows that interactions within the community are based on more complex patterns of communication relationships between users than just ideological similarities.

Table 3. Key Actors between Affinities

username	Community ID	outdegree centrality	indegree centrality	betweennes s centrality	affinity
bernamadotcom	995	1.000000	1.000000	0.500000	Pro-Palestina
AldryBobSiregar	3033	0.500000	0.500000	0.500000	Pro-Palestina
mulfti	435	1.000000	0.666667	0.333333	Pro-Palestina
khairulhasli	3727	1.000000	0.666667	0.333333	Pro-Palestina
dina_sulaeman	733	0.666667	1.000000	0.333333	Pro-Palestina
BSbukit	50	0.054545	0.018182	0.001010	Pro-Israel
JAZZ___says	2	0.023810	0.007937	0.000190	Pro-Israel
RezimBokek	8	0.003086	0.003086	0.000067	Pro-Israel
UNinIndonesia	93	0.005650	0.005650	0.000032	Pro-Israel
yonfassa	1970	1.500000	0.500000	0.000000	Pro-Israel
Jaccika4	1082	1.333333	0.333333	0.000000	Netral
BayoeBadra	1109	1.333333	0.333333	0.000000	Netral
MalikKashifPti	1171	1.000000	0.100000	0.000000	Netral
galihakartiko	1000	1.000000	0.000000	0.000000	Netral
kumarSrivasta19	1081	1.000000	0.000000	0.000000	Netral

These datas shows that despite the segregation of communities based on specific affiliations, the network is not completely siloed, as there is still significant interaction between users with differing views, especially in the efforts of pro-Palestinian communities to influence neutral users.

The use of word clouds to visualize relevant keywords facilitates the interpretation and grouping of topics, making these themes more visible. The themes found reflect various dimensions of the conflict, from narratives of war atrocities, struggle and resistance, to propaganda and public opinion, demonstrating the complexity of digital communication on social media.

This analysis relates to Ernest Bormann's Symbolic Convergence Theory (1985), which explains how collective narratives are built through symbols and themes that can create solidarity within a community. Themes such as "fighter" and "zionisttererrorist" reinforce collective narratives that build a sense of unity among pro-Palestinian and pro-Israeli communities. Symbolic characters such as "fighter" or "zionisttererrorist" and dramatic actions such as the use of hashtags demonstrate how individuals and groups use narratives to mobilize public opinion.

Furthermore, the analysis shows that these themes serve not only to consolidate internal support but also to build empathy and global awareness of the conflict. Heroic narratives, the suffering of victims, and propaganda engage international audiences, creating a strong emotional dimension in public perception.

Discussion of Findings

The findings show that communication patterns on social media X are dominated by tweet activity (78.043%), followed by reply (15.096%), mention (6.831%), and retweet (0.029%). The dominance of tweets reflects that this platform is used intensively to voice personal opinions and form narratives directly. The low percentage of retweets indicates that interactions on this network tend to be original, not just content amplification.

This diverse communication supports the mass communication theory which highlights that digital platforms allow individuals to become content producers. In addition, the existence of replies and mentions shows an effort to create dialogue, both in supporting and opposing the developing narrative. However, the intensity of communication which tends to focus more on tweets shows that this communication pattern is more directed at the dissemination of information than in-depth discussion.

This finding is in line with the new media communication theory put forward by (McQuail, 2011) which states that digital platforms allow individuals to become content producers independently. The concept of many-to-many communication in this theory is also reflected in the high activity of direct tweets and the use of mentions which indicate interactive communication.

Social network analysis revealed that the network structure consisted of 6,207 nodes and 6,583 edges, with key actors identified based on degree centrality, in-degree centrality, and out-degree centrality. In the pro-Palestine community, actors such as namadotcom served as the main connector, while in the pro-Israel community, actors such as yonfassa played a significant role in disseminating information.

These results are in line with the social network theory proposed by Granovetter (1973) on “the strength of weak ties,” where actors with high centrality play a significant role in connecting different groups in the network. This theory asserts that individuals with many connections have great potential in disseminating information and shaping public opinion. In addition, the use of the Louvain algorithm successfully identified heterogeneous communities with cross-affiliation interactions.

Social media is not only a field for voicing opinions but also a strategic tool in building narratives, mobilizing support, and influencing global public opinion. This finding supports the Social Mediated Crisis Communication (SMCC) theory proposed by Austin 2012, which states that social media functions as a space for individual actors and groups to disseminate information quickly during a crisis.

CONCLUSION

This study presents an in-depth analysis of digital propaganda in the Palestine-Israel conflict on social media X, focusing on communication patterns, and social network structures. Based on the results of the study, several main conclusions can be drawn. In the context of New Media Communication theory, social media X has served as a primary platform that allows individuals and groups to disseminate information, construct narratives, and influence public opinion widely. The interactive, real-time, and network-based characteristics of new media have provided a flexible space for various entities to convey their messages, whether pro-Palestine, pro-Israel, or neutral.

The analysis of communication patterns shows that communication on social media X is not siloed or isolated based on a particular political affiliation. Instead, there is intense interaction between pro-Palestinian, pro-Israeli, and neutral entities, with active efforts by pro-Palestinian and pro-Israeli groups to influence the opinions of neutral users. These results are in line with the Social Mediated Communication theory which highlights the role of social media as a discursive arena that allows various parties to engage in dialogue, although often colored by conflict and polarization. The high frequency of communication via tweets

(78.043%) compared to replies, mentions, and retweets, indicates that key actors utilize social media to convey their messages directly to a wider audience.

Within the framework of Communication Network Theory, Social Network Analysis (SNA) analysis shows that the structure of the social network in this conflict is heterogeneous, with 6,207 nodes and 6,583 edges. Community clustering using the Louvain algorithm reveals the existence of communities that are interconnected but still maintain their respective identities. The identified network dynamics, where pro-Palestinian and pro-Israeli entities tend to direct their messages to neutral entities, underscore the importance of the role of neutral actors as information bridges. This supports the concept of bridging in network theory, which suggests that connections between communities can expand the reach of messages and increase network cohesion.

This study concludes that social media X plays a very important role in shaping narratives, disseminating information, and mobilizing public opinion regarding the Palestine-Israel conflict. The characteristics of digital communication on social media allow various actors to utilize cyberspace in fighting for their interests, whether through the spread of propaganda, mobilization of solidarity, or global campaigns for justice and humanity. These findings provide an important contribution to the understanding of how modern conflicts are mediated by new communication technologies, as well as how actors in digital social networks utilize the characteristics of new media to build narratives and influence public opinion globally.

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