

Sentiment Analysis of Twitter Data: Understanding Public Opinion before the 15th General Elections in Malaysia

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ABSTRACT

Amid the ever-growing social media content, sentiment analysis is a technique that is necessary for analyzing public opinion. This paper aims to discover what sentiment prevailed and what reaction took place preceding the election. This paper also presents the results of a study that applied sentiment analysis to Twitter data relating to the 15th General Elections of Malaysia. This research reviews several sentiment analysis techniques based on Twitter data. Using the method of analyzing 1566 tweets, including re-tweets and replies, gathered between November 12th and November 18th, 2022, the findings give us an understanding of the level of emotions that were tweeted by the users of Twitter towards the 15th general election in Malaysia. The results indicate that the sentiments expressed in the analysed tweets are distributed as follows: slightly positive (41%), positive (31%), neutral (24%), and slightly negative (4%).

Keywords: *15th General Elections; Twitter; Sentiment Analysis; Tweets; Hashtags*

Background

The study of measuring feelings, called opinion mining or sentiment analysis, is now very important. It helps us know what the public thinks and feels on social media sites. Scientists use feeling study for many things, like looking at big events such as elections or wider changes that come from world happenings like the COVID-19 virus. In 2022, Malaysia's political scene changed a lot. This was most noticeable during the 15th general election of that year. The elections ended with a deadlock in the government. This was really important because no group or set of groups got more than half of the seats. This unique result has caused people to ask about how coalition politics is becoming a normal thing and the bigger problems they cause when it comes to stability in their nation (Moten 2023, Ong 2023).

Leaders like Anwar Ibrahim helped guide the political path, joining forces against their opponents and eventually winning. This shows how hard politics can be in Malaysia (Chin, 2023).

Furthermore, the variety in how Malays vote and feel was shown by studies from Iman Research. This highlighted that political favourites are different among people who can vote (Iman Research, 2023). Things like worries about Malay rights, Islam, honest leadership, and keeping community interests safe were very important for feelings before the election. Political campaigns have changed a lot. They now use new ways like live streaming and social media, which make the choice of who to vote for more complex (Iman Research, 2023). It's important to know how Malaysians feel, especially during the 15th general elections. This helps understand politics and its effects on the country's future.

The rise of social media sites, especially Twitter, has provided a lot of data for studying emotions. Chaudhry and his team (2021) did a full study of how people felt on Twitter about the U.S. Election 2020, finding hidden feelings about the candidates and showing how mail voting affected what people thought. This research showed how powerful social media is in showing what people think during important political happenings. Hasan and team (2018) showed how machine learning can help understand political feelings on Twitter. They focused on the importance of computer tools in figuring out what people think. In Malaysia, monitoring social media sentiment using AI is crucial due to evolving political dynamics and diverse public opinions.

This paper aims to contribute to the existing body of knowledge by focusing on sentiment analysis of Twitter data to understand the sentiment and opinions of the Malaysian public during the 15th general elections. By building on the methodologies and insights provided by previous studies in diverse contexts, through an analysis of Twitter data, this study seeks to provide valuable insights into the dynamics of political sentiment, contributing to a deeper understanding of the factors influencing public opinion and shaping the political landscape in Malaysia. Twitter is a valuable data source for studying political sentiment. Therefore, collecting sentences could be displayed for corrective actions by political campaigners. The following sections will delve into the methodologies employed in sentiment analysis.

Significance of the Study

The research thus becomes important as it is a guiding light in the crafting of relevant policy designs for general elections in Malaysia. It has been found that sentiments expressed through tweets are a significant asset for the formation of public opinion, and the reaction of policymakers is aimed at understanding the voters' moods. This awareness cuts across a wide array of political lines, hence making deliberations on the current political context in the country. Moreover, the investigation explores the social media effect on public discourse and how it informs the opinion of the general public. Thanks to the sentiment analysis technique, policymakers could find out the crucial problems and ideas among their electorate; therefore, they could direct their policy initiatives toward the most interested people.

Likewise, the article emphasizes the significant role played by technological advancements, namely, artificial intelligence, machine learning, and other related software packages, in sentiment analysis. With the help of AI and data analysis, public officials can get a more profound perception of social tendencies, which is crucial for dealing with upcoming problems and identifying new opportunities. In conclusion, by utilizing Twitter data in the process of policymaking, change makers can acquire a more thorough understanding of the welfare of society and the goals of their public. As the results would be more effective and responsive, policymaking would be enhanced.

Literature Reviews

This literature review offers a summary of crucial studies and outcomes in the sentiment analysis field, with great emphasis on the use of this analytical technique in political discernment and particularly in

understanding the Malaysian General Election process that was held in 2022. Along with this, it dives deeper into the analytical approaches utilized, technological developments, and applications of sentiment analysis in various functional areas.

The research on sentiment analysis encompasses diverse contexts and methodologies. Mishra, Rajnish, & Kumar (2016) conducted sentiment analysis on Twitter data regarding the Digital India initiative, revealing a distribution of 50% positive, 20% negative, and 30% neutral opinions, showcasing the importance of understanding public perceptions of government programs. Fornacciari, Mordonini, & Tomaiuolo, (2015) delved into sentiment analysis related to a pop music event on Twitter, achieving high accuracies for polarity and subjectivity classification and identifying prevailing negative sentiment and key users within the social network. El-Beltagy and Ali, (2013) addressed challenges in sentiment analysis of Arabic social media, highlighting issues such as the lack of colloquial Arabic parsers and sentiment lexicons, and presented a case study on the sentiment orientation of Egyptian Arabic microblogs, indicating lower accuracy compared to English sentiment analysis.

Kauffmann *et al.*, (2020) proposed a framework for big data analytics in commercial social networks, emphasizing sentiment analysis and fake review detection for marketing decision-making and aiming to extract market intelligence from user reviews. These studies contribute valuable insights into sentiment analysis methodologies and applications across government initiatives, social events, and commercial markets.

Iglesias and Moreno (2019) carried out a study extending sentimental analysis in social media to envisage the leading fields in which it would be applied nowadays. They debated about the technical dimensions such as two-level semantic network map visualization, CNN sentiment classification, and deep learning methods for emotion classification in tweets. Also, they tested different types of usage, like analyzing consumer characteristics through health insurance attributes and classifying people in health-themed forums as male or female. The analysis revealed the fluctuating nature of opinion detection among online users through a dynamic analysis.

Flores-Ruiz, Elizondo-Salto, & Barroso-González (2021) investigated changes in consumers' buying patterns during the COVID-19 pandemic through survey questionnaires and analysis of Twitter content. Following these, there was an observation that security-conscious travel and individual trip modes to less crowded places had a greater likelihood of being the next trend, indicating the social media function of predicting novel tourist behaviors. Shukri and Tai (2015) dealt with sentiment analysis of Twitter in the context of the automotive industry; they divided tweets around BMW, Mercedes, and Audi into positive, negative, and neutral posts. This was instrumental in shaping, positioning, and marketing strategies for the auto companies to be able to come up with the most competitive choices.

In the 15th general election that took place in 2022, Malaysia had a surprising political change. The result was a deadlock, as no political captain guided the majority. Personalities like those of Anwar Ibrahim, depicting a variety of features, were mainly responsible for making this intricate political terrain pass through the hands of a coalition and finally make them win (Moten, 2023; Ong, 2023; Chin, 2023).

It was found out, as Iman Research showed, that there was a wide gap among voters in Malaysia in that most of them were highly concerned about Malay rights and the Islam-dominant country, while others preferred those who are honest and have the interest of the community. The traditional political campaigns were developed and modified with the adoption of new approaches like live streaming and social media platforms, and these revolutions made the voter's decision-making processes more complex (Iman Research, 2023).

Social media platforms, like Twitter in the first place, helped track public mood and gain better knowledge of public opinions during important political events. Numerous studies were conducted by Chaudhry and his colleagues (2021) on the US Election 2020 to reveal the power of social media for manifesting true and hidden feelings about the election and the impact of mail voting. Just as has been shown by Hasan *et al.*, (2018), machine learning content analysis of political sentiments on Twitter has proven to be beneficial. In Malaysia, Machine Learning algorithms, which have been extensively researched to help monitor social media sentiment, are reportedly becoming more crucial in today's mixed political landscape, where major political players tend to ignore differing viewpoints (Chaudhry *et al.*, 2021; Hasan *et al.*, 2018).

Sentiment analysis on Twitter has been highlighted in various aspects as well. Fornacciari *et al.*, (2015) proposed various rules for classifying tweets with respect to another pop event. The examination of the case studies also brought to the fore the most common issues of sentiment analysis, like irony, sarcasm, and a lack of information, along with some of the idiosyncratic-specific issues of the chosen channel, like the use of songs' lyrics. For instance, another study gives a detailed outline of sentiment analysis made through machine learning algorithms with the use of Twitter data, bringing up the importance and applicability of this issue for present-day digitalization (Chaturvedi *et al.*, 2023). Another article focuses on an empirical analysis using Twitter data to come up with a sentiment mark on the automotive industry. Directing the analysis on the top three brands, i.e., Mercedes, Audi, and BMW, the study mines tweets for sentiments and feelings to measure the perceived brand value. Findings produced the highest share of positive tweets (72%) linked to the BMW brand, with a higher share of the joy classification in contrast to Audi and Mercedes. On the contrary, however, the figures have been split into Audi and Mercedes-Benz, which show the higher percentages of the sad tweets. The level of engagement rates is the next factor to consider, with BMW boasting the lead on Twitter (62% engagement) and Mercedes dominating on most different online platforms (Shukri *et al.*, 2015).

The use of hashtags and word counts plays a role in reconstructing the understanding of public opinion, especially in voting decisions. Twitter hashtags of the day can be reflections of the voters' responses and sometimes even steps ahead of poll results, as these give the momentous and immediate information that the public thinks of the candidates for office (Rita, António, & Afonso, 2023). Besides, public opinion could be grabbed from Twitter data that are statistically highly verified in secret cases, including election time, when they are compared with the official voting turnouts (Kavitha, Saveen & Imtiaz, 2018). Hashtag analytics of subjects tweeted about can be used to follow online attitudes or discover the mood with reference to different events, which are useful for sentiment detection systems (Lee, 2018).

Public opinion could shift in the choice over political leaders and their display of emotions. Additionally, sentimental factors lead to societal attitudes, behaviors, and trends. People's views have an enormous impact on forming society's opinion of the leader (Masch & Gabriel, 2020). Across the span of history, the idea of public opinion in identifying political parties to stimulate morality and reform society has been a potent tool for Americans (Schmeller, 2023). The findings suggest that outbursts of mass public sentiment, such as, for example, a change in electoral support, can provoke serious consequences for society, with in-sight causal indications being the critical factor in preventing these devastating outcomes like riots or the collapse of nations (Chung, Chew, & Lai, 2016).

The development of modern TV broadcasting with personal perspectives has extended political leaders' capabilities to influence the public's opinion; therefore, such personality-driven opinions can influence attitudes and sentiments within society (Markus Gabriel 2020). Combining that with the quantity of multiple wave surveys has also given social scientists an easy task to make changes in public opinion trends by using latent trend models (Kołczyńska, & Bürkner, 2024), meaning that the quality and quantity of data are highly important issues for the right estimation of society's opinions and behaviors.

Methods

The aim of this paper is to investigate sentiment analysis as a tool for understanding public opinion in Malaysia prior to the 15th general election period. By analyzing sentiments expressed in tweets from the week leading up to the election, during a period of heightened uncertainty, we aim to shed light on prevailing attitudes and perceptions among the populace.

Sentiment analysis is mostly used in public opinion research on social media. Besides using specialized tools and a systematic method, consumer sentiments can be analysed by tweets; this is indeed yielding good ideas about public opinions and upcoming trends. Thus, becoming more aware of public emotions, feelings, and preferences will enable us to develop better policies and strategies and make informed decisions.

Data Collection & Analysis

This study employs a qualitative method with descriptive statistics from Twitter user tweets related to the 15th general election in Malaysia. This dataset of tweets was collected and analysed using sentiment analysis to determine the public sentiments towards the elections one week before voting day. A total of 1,566 were collected between November 12th and November 18th, 2022, leading up to the Election Day on November 19th, 2022. The researcher set the number of tweets to be collected at two thousand tweets as a limit.

Data collection was conducted using the extraction method with software called Maxqda22, searching for tweets containing keywords such as "elections," "Malaysia," "voting," "parties," "politics," and "UMNO." Accordingly, three types of data were collected for analysis: tweets, tweet types (original tweets, re-tweets, replies), sentiment, most frequently used words, most frequently used hashtags, author Twitter names, and author follower counts. The researcher selected Twitter handles of tweets only sent by people using active accounts for the past three years in order to conduct the analysis.

Results

This section presents and discusses the data analyses and the findings of this paper, which revolve around specific points. To start with, the sentiment analysis using 15th general election data of 2022 held in Malaysia. The next part of the investigation is equally important in establishing the distribution of different types of tweets during the elections. The third point presents a word cloud related to the 2022 general elections in Malaysia that shows notable key phrases and themes. It is only at the last stage that we study the most frequently used hashtags that are linked to the 15th General Elections in Malaysia.

Twitter Sentiment and Elections

The objective of this section is to understand the types of sentiments toward the election process and outcomes. Figure 1 shows the outcome of the sentiment analysis that was completed about the 15th general elections held in Malaysia. The analysis categorizes sentiments into five groups: negative, slightly negative, neutral, slightly positive, and positive.

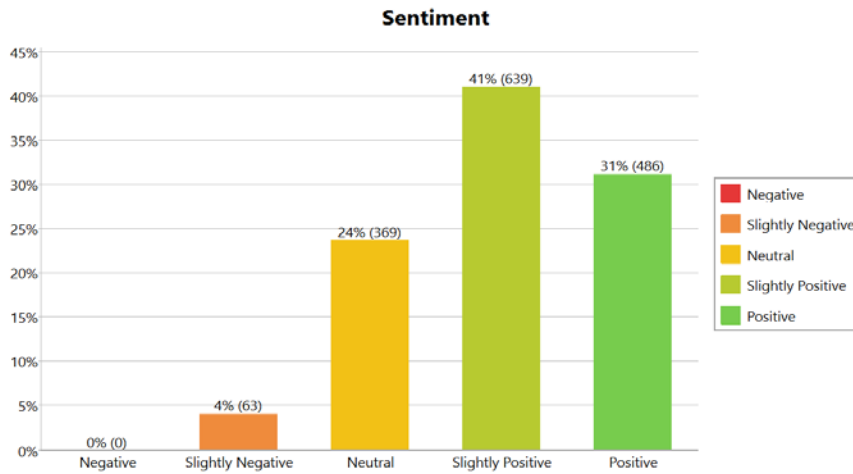


Figure 1: Sentiments of Publics

Among these categories, the largest portion was positive sentiments, which is 41%, followed by the category of slightly positive sentiments (31%; and neutral sentiments (24%. Another category of sentiment in population opinion is slightly negative, which constitutes only 3% of all.

Further, this study found that there are no sentiments categorized as outright negative, which reflects that the public was optimistic. If the result of such an analysis was supposed to reflect what the general population thinks, we might conclude that before elections, there is a high level of support or satisfaction with the election process or outcomes. The political powers can adapt their positioning to be in line with what the people voted for in elections. This could indicate confidence in the fairness, transparency, and effectiveness of the electoral measure, and it is also approved of the electoral results and the democratic procedure. Apart from maybe this, this can as well be a sign of deep trust in political institutions or leaders, including those responsible for the elections. However, it's essential to interpret these findings cautiously, considering the limitations of sentiment analysis and the representativeness of Twitter users compared to the broader population.

Types of Tweets

This part of the analysis aims to understand the activity of Twitter during the 15th general election. That includes tweets, re-tweets, and replies. The examination of activity-informing strategies for political parties on Twitter usage.

The figure (2) below clearly shows that the activities of the Malaysian 15th general elections on Twitter in the different types are distributed. These activities are classified into three categories: tweets, retweets, and replies.

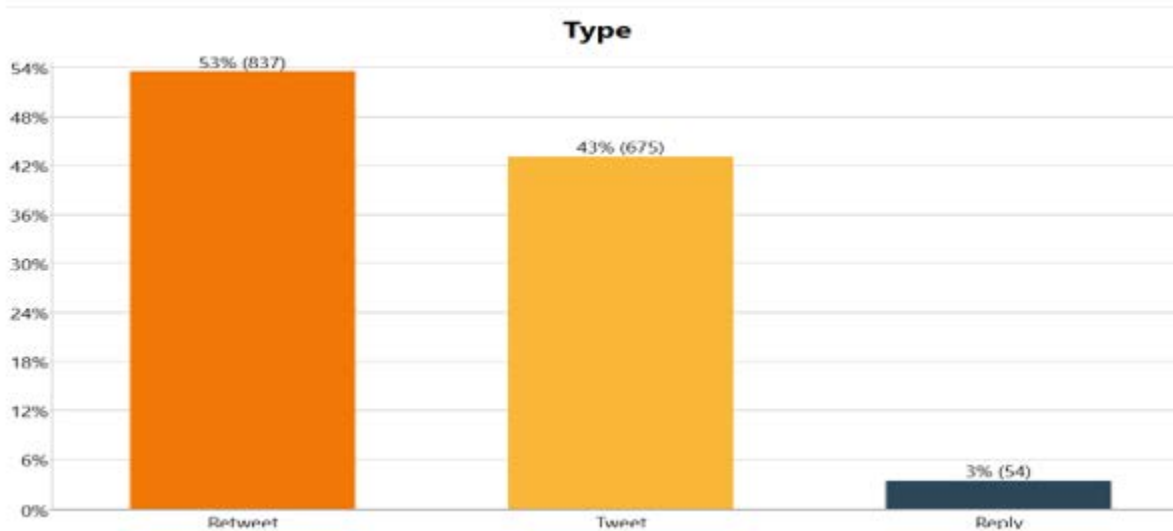


Figure 2: Types of Tweets

Similarly, among 53% of re-tweets, there is a predisposition of users to tweet existing materials, which is a sign of wide re-tweet consumption. The original tweets account for 43%, which signals considerable interaction owing to individual content creation. The process of content creation through the original tweet undoubtedly brings the general public together. Replies occupy the smallest proportion at 3%, indicating that users only interact with the author of the post on a less likely basis. The high percentage of re-tweets implies an effect on the information direction that is dissemination, and the substantial number of original tweets shows the users to create individual viewpoints. The text's number limitations can, for example, mean less engagement in discussions or a broadcast-like conversation. This information, on the other hand, emphasizes the importance of information sharing during elections and will guide the strategies for election parties on how to optimally use highly shareable content. Besides that, the more comprehensiveness of the content analysis, the seasonal trends, and the user demographics would give more insights about the user behavior and engagement patterns related to the election period.

These section findings highlight information sharing during the elections and help in crafting party policies and strategies for maximizing shareable content. Additionally, a more comprehensive analysis could provide insights into user behavior and engagement patterns during the election period.

Word Cloud and Elections

Figure 3 shows a word cloud that is a representation of the frequency of sentence words in discourse, which is connected to the election organized in Malaysia on the 15th. Catchwords like "Malaysia", "GE15", and "elections" hint at conversations about general topics, while names like "Anwar," "Ibrahim," and "Umno" are indicative of its significant figures and political bodies.

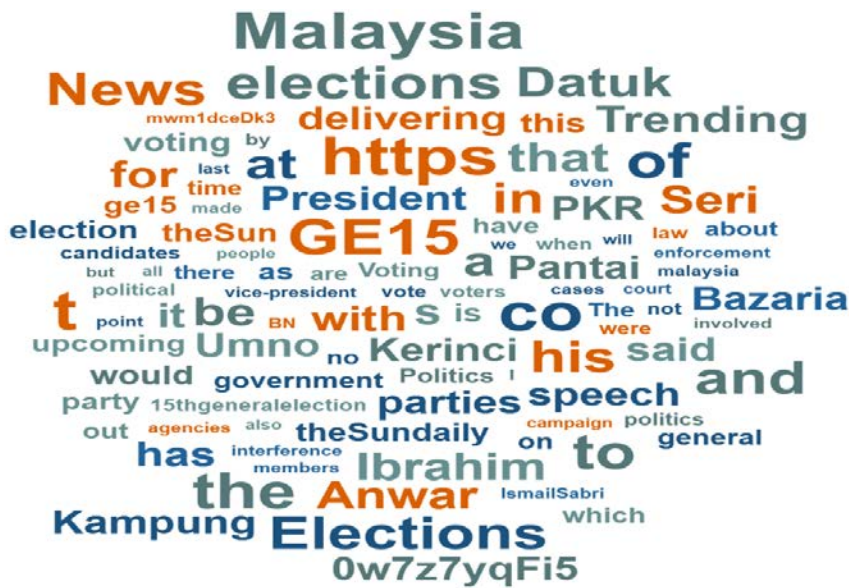


Figure 3: Words, Cloud, and Elections

Additionally, the frequent use of "news," "voting," and "politics" demonstrates these topics are among the most common ones that can be found in people's conversations in this context. With the appearance of specific words like "https" and "Datuk," we see that the conversation was more diverse and consisted of news sources, digital engagement, or localities. While the word cloud provides some idea about what the document is about and what the most frequent terms are in it, it does not give additional information, such as context and sentiment. Generally, the word cloud points to a discourse about the political process that focuses on the contenders, parties, and procedure of the election as the major matters, with the online space as a platform of communication.

Most Frequently Used Hashtags

Figure 4 explains the hashtags with the highest percentage that were used in connection with the 15th General Election in Malaysia. The #malaysia, #ge15, and #elections hashtags top the trending topics, and this could be an indication of increased involvement and participation amongst the majority in the national identity and the election process.

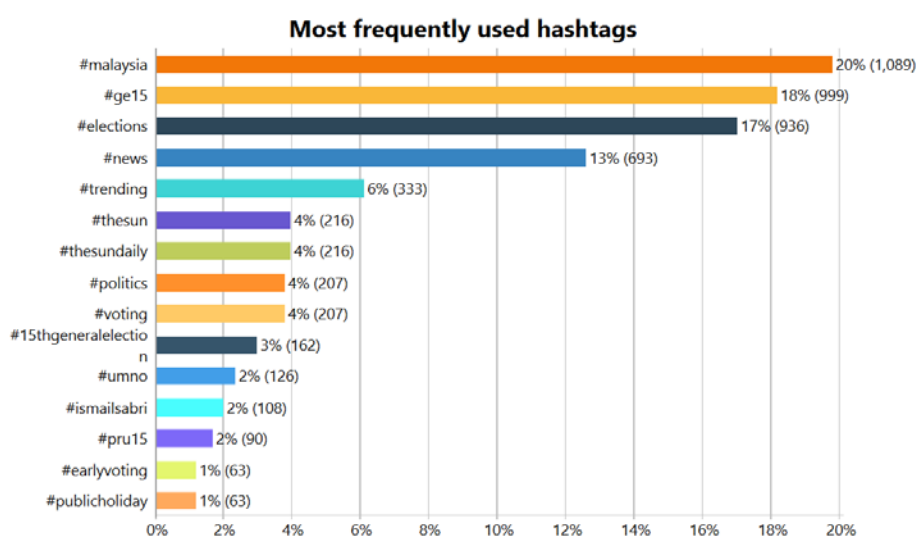


Figure 4: Most Frequently Used Hashtags

The presence of #news demonstrates participants' interest in news as well as information related to elections. #ismaisaibri and #umno, as examples, show discussions on candidates or parties. The hashtags like #earlyvoting and #publicholiday are not much used, which signifies either an insignificant impact of these events in wider Twitter discourse or the conversation part of it. The data shows indeed engagement among various constituents and, therefore, a penetrating appearance among the Twitter users while political news consumption and public narratives are being shared. In another study aimed at deeper analysis, the correlation between Twitter engagement and actual political action, along with the context in which tags were collected, could be investigated. It will give new angles to look at the hashtag dynamics during the run-up to the elections.

Conclusion

In conclusion, this research paper has provided a valuable analysis of the public sentiments and attitudes towards the 15th general elections in Malaysia through the application of sentiment analysis on Twitter data. This paper indicated that the majority of tweets (72%), which were before the 15th general election, pointed to a positive sentiment among Twitter users, mainly towards the election process, with some having neutral emotions and a very few others showing negative sentiments. The election results in the study give a very positive picture for the elections. This might be related to a high level of popularity among public satisfaction or optimists with the outcome. To illustrate, the Twitter tweet analysis shows that even though the existing marketing plans will be given priority in the dissemination of information, especially through the option of being retweeted and notable content creation as well.

Nonetheless, the flaws should be noted in that they include the need for a more contextual sense of the sentiments involved and the influence of the sampling methods and sentiment analysis methods. Advancing that research stream, future analyses go deeper into the mechanisms of public opinion during the outrun of election periods, taking into account explanatory factors other than the social sphere and using different analysis sources to provide a more thorough understanding of political discourse and public opinion. Mainly, through this study, we expand the number of studies conducted on sentiment analysis and its practical applications in the sphere of public opinion formation in the political environment of Malaysia, which provide some useful input to the actors of political life and the relevant policies' formulation.

The studies of sentiment analysis findings offer valuable insights for effective policy design in Malaysia, especially regarding general elections, such as targeted initiatives where the public opinion on important issues can be analyzed with the help of sentiment analysis, which could then be addressed by the policymakers and will show their responsiveness to the public needs. One more thing is in communication strategy, where in the process of elections, portraying messages in line with the general tone of society helps to strike a chord with the voters.

Declarations

Ethics Approval & Consent to Participate: Not applicable.

Conflict of Interests: Not applicable.

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References

- Chaudhry, H. N., Javed, Y., Kulsoom, F., Mehmood, Z., Khan, Z. I., Shoaib, U., & Janjua, S. H. (2021). Sentiment analysis of before and after elections: Twitter data of us election 2020. *Electronics*, *10*(17), 2082. <https://doi.org/10.3390/electronics10172082>
- Chaturvedi, D., Jain, T., Mishra, A., & Kapoor, A. (2023). Sentiment Analysis of Twitter Data using Machine Learning: A Case Study of SVM Algorithm. <https://doi.org/10.21203/rs.3.rs-2850627/v2>
- Chin, J. (2023). Anwar's long walk to power: the 2022 Malaysian general elections. *The Round Table*, *112*(1), 1-13. <https://doi.org/10.1080/00358533.2023.2165303>
- Chung, N. N., Chew, L. Y., & Lai, C. H. (2016). Critical Transitions in Public Opinion: A Case Study of American Presidential Election. *arXiv preprint arXiv:1610.05426*. <https://doi.org/10.48550/arXiv.1610.05426>
- El-Beltagy, S. R., & Ali, A. (2013, March). Open issues in the sentiment analysis of Arabic social media: A case study. In *2013 9th International Conference on Innovations in information technology (IIT)* (pp. 215-220). IEEE. <https://doi.org/10.1109/Innovations.2013.6544421>
- Flores-Ruiz, D., Elizondo-Salto, A., & Barroso-González, M. D. L. O. (2021). Using social media in tourist sentiment analysis: A case study of Andalusia during the COVID-19 pandemic. *Sustainability*, *13*(7), 3836. <https://doi.org/10.3390/su13073836>
- Fornacciari, P., Mordonini, M., & Tomaiuolo, M. (2015, June). A case-study for sentiment analysis on twitter. In *WOA* (pp. 53-58).
- Hasan, A., Moin, S., Karim, A., & Shamshirband, S. (2018). Machine learning-based sentiment analysis for twitter accounts. *Mathematical and computational applications*, *23*(1), 11. <https://doi.org/10.3390/mca23010011>
- Iman Research. (2023). "Election Sentiments Analysis of Malaysia's 15th General Elections (GE15) FINAL REPORT." <https://www.imanresearch.com/wp-content/uploads/2023/01/Election-Sentiments-Analysis-of-Malysias-15th-General-Elections-GE15-FINAL-REPORT.pdf>.
- Iglesias, C. A., & Moreno, A. (2019). Sentiment analysis for social media. *Applied Sciences*, *9*(23), 5037. <https://doi.org/10.3390/app9235037>
- Kauffmann, E., Peral, J., Gil, D., Ferrández, A., Sellers, R., & Mora, H. (2020). A framework for big data analytics in commercial social networks: A case study on sentiment analysis and fake review detection for marketing decision-making. *Industrial Marketing Management*, *90*, 523-537 <https://doi.org/10.1016/j.indmarman.2019.08.003>
- Kavitha, G., Saveen, B., & Imtiaz, N. (2018, December). Discovering public opinions by performing sentimental analysis on real time Twitter data. In *2018 International Conference on Circuits and Systems in Digital Enterprise Technology (ICCSDET)* (pp. 1-4). IEEE. <https://doi.org/10.1109/ICCSDET.2018.8821105>
- Kołczyńska, M., & Bürkner, P. C. (2024). Modeling public opinion over time: A simulation study of latent trend models. *Journal of Survey Statistics and Methodology*, *12*(1), 130-154. <https://doi.org/10.1093/jssam/smad024>

Lee, H. W. (2018). Using Twitter Hashtags to gauge real-time changes in public opinion: an examination of the 2016 US presidential election. In *Social Informatics: 10th International Conference, SocInfo 2018, St. Petersburg, Russia, September 25-28, 2018, Proceedings, Part II 10* (pp. 168-175). Springer International Publishing. https://doi.org/10.1007/978-3-030-01159-8_16

Masch, L., & Gabriel, O. W. (2020). How emotional displays of political leaders shape citizen attitudes: The case of German Chancellor Angela Merkel. *German Politics*, 29(2), 158-179. <https://doi.org/10.1080/09644008.2019.1657096>

Mishra, P., Rajnish, R., & Kumar, P. (2016, October). Sentiment analysis of Twitter data: Case study on digital India. In *2016 International Conference on Information Technology (InCITE)-The Next Generation IT Summit on the Theme-Internet of Things: Connect your Worlds* (pp. 148-153). IEEE. <https://doi.org/10.1109/INCITE.2016.7857607>

Moten, A. R. (2023). Research Note: The 15th General Elections in Malaysia. *Contemporary Southeast Asia*, 45(1), 111-127.

Ong, K. M. (2023). GE15: opening up new vistas for comparative research on Malaysian politics. *The Round Table*, 112(3), 335-336. <https://doi.org/10.1080/00358533.2023.2219528>

Rita, P., António, N., & Afonso, A. P. (2023). Social media discourse and voting decisions influence: sentiment analysis in tweets during an electoral period. *Social Network Analysis and Mining*, 13(1), 46.

Schmeller, M. (2023). Public Opinion in Emerson, D. B., & Laski, G. (Eds.). *Democracies in America: Keywords for the 19th Century and Today* (pp. 142-C12.S1). Oxford University Press. <https://doi.org/10.1093/oso/9780198865698.003.0013>

Shukri, S. E., Yaghi, R. I., Aljarah, I., & Alsawalqah, H. (2015, November). Twitter sentiment analysis: A case study in the automotive industry. In *2015 IEEE Jordan conference on applied electrical engineering and computing technologies (AEECT)* (pp. 1-5). IEEE. <https://doi.org/10.1109/AEECT.2015.7360594>