How to Cite:
Masud, R., Syamsurrijal, M., Baharuddin, T., & Azizurrohman, M. (2022). Forecasting political parties and candidates for Indonesia's presidential election in 2024 using twitter. *International Journal of Health Sciences*, *6*(S6), 1323–1333.
https://doi.org/10.53730/ijhs.v6nS6.10691

Forecasting political parties and candidates for Indonesia's presidential election in 2024 using twitter

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***Abstract*---**The purpose of this study is to forecast the political parties and candidates running for president of Indonesia in 2024. Nvivo 12 software is used in this study's quantitative methodology for descriptive content analysis. Twitter users are the study's research subjects. The information was collected via Twitter Search, which targeted the term "Pilpres 2024." According to this analysis, Anies Baswedan, Prabowo, and Ganjar Pranowo will be the winning candidates. Political parties' geographic distribution reveals that the 2024 presidential election would see political tensions between parties with nationalist and religious ideologies.

***Keywords*---**Indonesian president, candidate prediction, twitter.

Introduction

The issues regarding the presidential election 2024 have been widely discussed, although there is still some time left for its holding. These issues are discussed in the public sphere and have also been addressed in digital spaces such as social media. Several profiles of candidates and political parties also began to emerge in the discussion, which influenced the public's assessment of the opportunities and

results of the upcoming elections. The debate took advantage of various social media platforms, including Twitter. Twitter has been widely used to assess candidate odds and political battles in elections (Buccoliero et al., 2020; Awais et al., 2021). The assessment often considers every information and message on Twitter ahead of the election (Kušen & Strembeck, 2018); Liu et al., 2021). This tendency to use social media also often underlies the emergence of political debates, thus influencing the diffusion of information to become more expansive and spread more quickly (Boulianne, 2019; Feezell, 2018). This tendency also affects public political interest or other social media users in developing discourse.

Many studies predicting the presidential election have been carried out. However, very few studies still assess cases in the upcoming 2024 presidential election, especially elections in Indonesia, by analyzing using Frequency Query and Text Search Query approaches. However, several studies are considered quite relevant that can be mapped. *First,* the election results in the general election can be known through social media, but they are only predictive and not absolute (Cameron et al., 2016; Jaidka et al., 2019). *Second,* an assessment of the probability of an election outcome can be analyzed using sentiment analysis (Chauhan et al., 2021; Heredia et al., 2018). *Third,* the results of the election predictions also influence voters' political attitudes and political preferences before the election begins (Grover et al., 2019; Billingsley et al., 2018). *Fourth,* predicting the presidential election can use Twitter as a popular micro-blogging social media platform that has been used in several case studies such as elections in the U.S., UK, Spain, France, and Indonesia. (Budiharto & Meiliana, 2018; Singh et al., 2017).

Based on the description above, this study aims to analyze the predictions and possibilities of the 2024 presidential election in Indonesia. In addition, this study seeks to fill in the gaps of previous research. This study aims to investigate several aspects of Indonesian politics in preparation for the 2024 presidential election, including mapping the candidate profiles, political parties, and the applicability of Twitter predictions. In light of these three factors, it is hoped that this study would be able to contribute to political and social media research, particularly in evaluating the current environment and future projections before the next presidential election.

Literature Review

Election Forecasting in Social Science

Political scientists have put up several election predicting models over the past few decades. The first presidential election forecasting model, which was based on political science theory, was created by Lewis-beck & Rice (1982). The gross national product (GNP) growth rate in the first two quarters of the election year and the president's job approval rating in the July Gallup poll are used as two predictive parameters in the model. The trial-heat model was created by Campbell and Wink (1990) using this concept as a foundation. The two predictive variables in the model are the second-quarter growth rate in the real GDP of the election year and the support for the incumbent party candidate in the early September

Gallup poll (Campbell & Wink, 1990). Another model, the convention-bump model, was created by the group in 1992. It takes into account three predictors: the second-quarter GDP growth rate in the economy, the net change in the incumbent party's candidate support after both conventions, and the support the incumbent party's candidate received in the pre-convention polls (Campbell et al., 1992).

Holbrook & Desart (1999) presented a straightforward forecasting model, dubbed the long-range model, for state-level presidential outcomes based on state-wide preference polls and a lagged vote variable, whereas the preceding models are in the form of mathematical functions applicable at the national level. Four factors are taken into account by this model when predicting outcomes: the state-wide voting results from the previous election; the national polls conducted in October before the election; whether the state is the home state of the Democratic or Republican candidate; and the number of terms the Democratic incumbent is currently serving. In 2001, Abramowitz introduced the time-for-change model. It is based on three factors: if the current president's party has held the White House for one term or more; the incumbent party candidate's mid-year approval rating in the Gallup poll (late June or early July); the growth rate of real GDP in the second quarter of the election year (Abramowitz, 2001).

Presidential Forecasting through Twitter

Researchers began using Twitter data to help with election forecasts with the emergence and rising popularity of big data in the twenty-first century (Ahmed et al., 2016; Bermingham & Smeaton, 2011; Chung & Mustafaraj, 2011). Several studies have claimed that attitudes collected from tweets in the U.S. and other countries can be used to predict political election outcomes using Twitter data (Burnap et al., 2016; Ceron et al., 2014; Grover et al., 2019b; Paul et al., 2017; Sang & Bos, 2012; Swamy et al., 2017; L. Wang & Gan, 2017). Sentiment analysis, also known as opinion mining, seeks to analyze people's opinions, sentiments, evaluations, appraisals, attitudes, and emotions about entities such as products, services, organizations, people, issues, events, themes, and their qualities from written language (Liu 2012). Sentiment analysis' goal is to locate or classify the attitude that is being expressed in a piece of writing. The attitude towards a subject might be favorable (favorable), negative (unfavorable), or neutral (Nasukawa & Yi, 2003).

Sentiment research on Twitter data connected to elections mostly uses two different sorts of techniques. The first is lexicon-based, and the second is machine learning-based. A pre-defined sentiment lexicon is used in the lexicon-based approach to sentiment analysis, which compares the frequency or presence of terms in the given text to the words in the lexicon. For instance, Ahmed et al. (2016) projected elections in four nations and contrasted the accuracy of their predictions with the significance of various technology infrastructures and political systems in each nation. They used SentiStrength, a sentiment dictionary, to analyze sentiment by giving each tweet related to a party a positive and negative score. The four countries' levels of internet connectivity and political environments have varying effects on prediction accuracy.

Supervised learning methods and unsupervised learning methods are the two main subcategories of the machine learning approach for sentiment analysis. Previous research often used supervised learning techniques that need high-quality, pre-labeled training data sets. In the 2012 U.S. election, Wang et al. (2012) created a system for real-time analysis of Twitter sentiment toward presidential candidates. To categorize the sentiment, they trained a Naive Bayes model on unigram features. To categorize geotagged tweets toward either republican or democratic attitudes at the county level, Paul et al. (2017) gathered tweets six months before the 2016 U.S. presidential election. They used 1.6 million tweets from the Stanford Twitter Sentiment (STS) corpus to train the Support Vector Machine (SVM), Multinomial Naive Bayes (MNB), Recurrent Neural Network (RNN), and FastText models.

Despite the numerous studies on using Twitter sentiment to predict elections, Gayo-Avello identified many problems with these studies (Gayo-Avello, 2011; Metaxas et al., 2011; Sung et al., 2016). Because their studies were post hoc and the prior success of one election in one country did not guarantee generalization, he criticized that these works were not predictions at all. We shouldn't disregard rumors, propaganda, and false information because we believe all tweets to be reliable. Additionally, since the Twitter population is not a fair and impartial sample of the voting public, demographic data should be taken into account. Future research can utilize the tested political science forecasting models and combine them with Twitter-based election prediction (Gayo-Avello, 2013).

In addition to the issues stated above, academics challenged the fact that more than half of these studies only offer "analysis" rather than "prediction" (Gayo-Avello, 2013; Le et al., 2017; Yaqub et al., 2017). Even in the research that did predict election outcomes using a sentiment from Twitter, they hardly ever developed reliable models for the associations between sentiment and anticipated election outcomes. Instead, support for a particular politician or party was simply treated as positive sentiment, and vice versa. Additionally, rather than making forecasts at the county level, almost all of the earlier research did so nationally. In reality, the presidential election is decided county by county, and geography does play a significant effect. The predictions of presidential contenders and political parties that have the chance will therefore be examined in further detail in this study.

Method

This study uses a quantitative approach with descriptive content analysis. This approach describes the details of a text or message related to discussions and information on the Twitter social network connected to the 2024 presidential election. The research subjects are Twitter social media users. The research object is seen from the involvement of Twitter social media users in the discourse of the 2024 presidential election in Indonesia. Data obtained from social media Twitter with Twitter Search focused on keywords "*Pilpres 2024"*. The data collection and analysis were carried out using Ncapture and analysis software, namely Nvivo 12 Plus. Nvivo 12 plus software as an analysis tool that can display data in text and images through the data coding process. The analysis features used are Word Frequency Query and Text Search Query. These two features are used to map the

number of references that often appear on Twitter. The trend in the coding results in the data is then visualized and followed by in-depth analysis to answer research questions.

Results

Mapping of candidates in the election 2024 based on Twitter

Since political discourse is discussed in digital spaces such as Twitter, it also affects the mapping of candidate profiles predicted to participate in political contests. These potential candidates can become candidates who will advance in the 2024 presidential election in Indonesia.

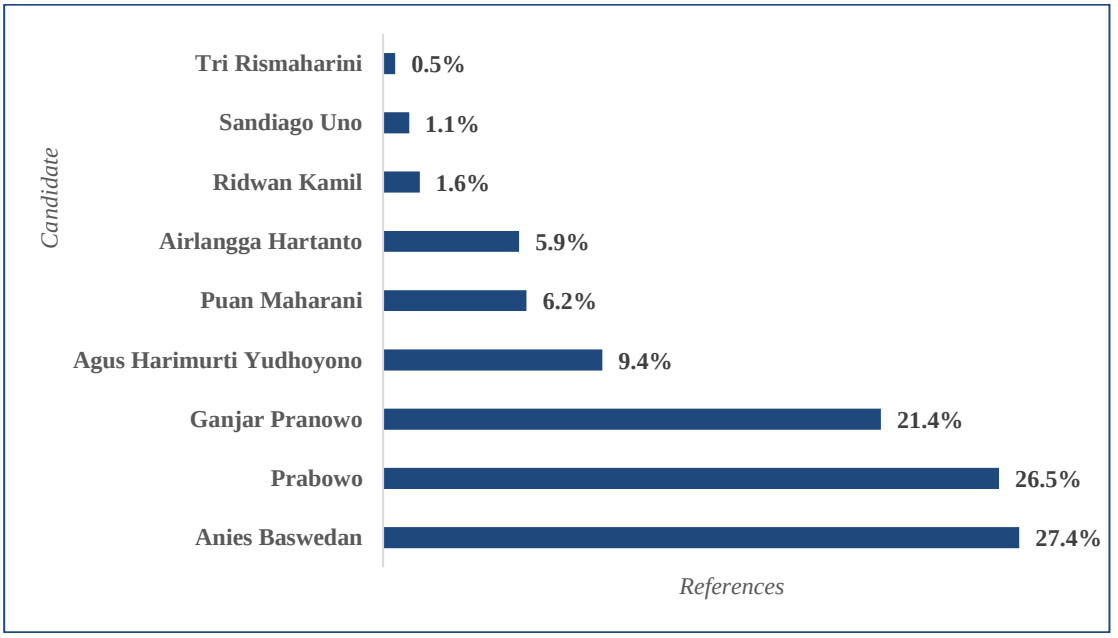

Figure 1. The most discussed candidate on Twitter

Figure 1 shows that there are several names of candidates who can participate in the presidential election as official candidates in the 2024 election. Anies Baswedan has the highest number of references (27.4%) among other candidates. Prabowo (26.5%). .2%), Airlangga Hartanto (5.9%), Ridwan Kamil (1.6%), Sandiaga Uno (1.1%), and Tri Rismaharini (0.5%).

Mapping of Political Parties in the Election 2024 based on Twitter

Apart from mapping candidates, it is also known that the mapping of political parties that are predicted to be involved in the next political contestation is also known. These political parties have the potential to influence candidates running for president and potentially influence the election results in the 2024 presidential election in Indonesia.

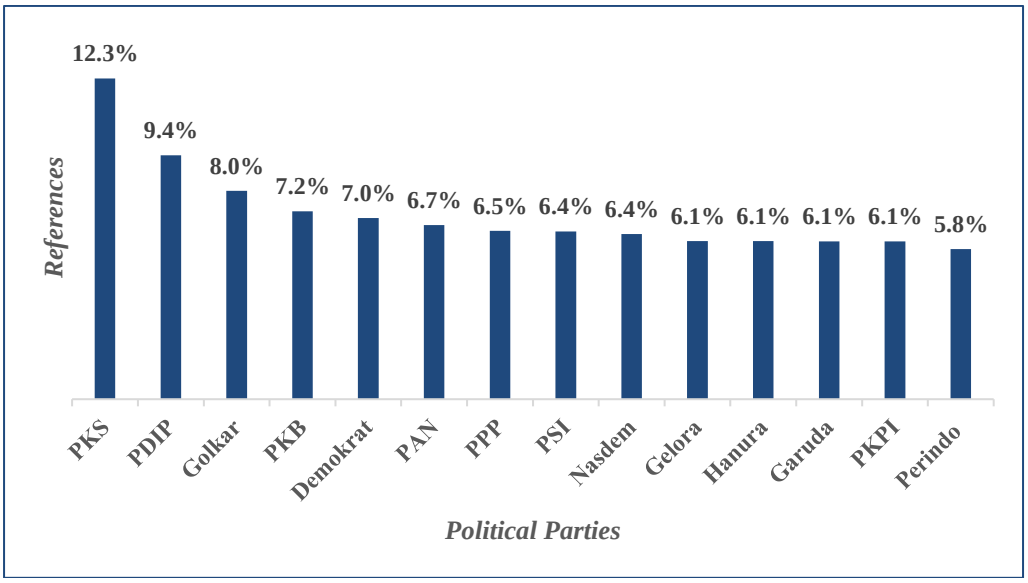

Figure 2. The most discussed political parties on Twitter

Figure 2 shows that several political parties are frequently discussed on Twitter. This is not only influenced by public awareness but also influenced by political party campaign models on Twitter. The PKS party is quite dominant (12.3%), followed sequentially by other political parties including the PDIP Party (9.4%), Golkar (8.0%), PKB (7.2%), Democrats (7.0 %), PAN (6.7%), PPP (6.5%), PSI (6.4%), Nasdem (6.4%), Gelora (6.1%), Hanura (6.1%). Garuda (6.1%), PKPI (6.1%), and the Perindo Party (5.8%).

Discussion

Potential candidates in the election 2024 based on Twitter predictions

The top three results, Anies Baswedan, Prabowo, and Ganjar Pranowo, are predicted to be very potential candidates for the 2024 presidential election. This is based on the number of references that the three of them are pretty dominant over other candidates. Meanwhile, six other candidates are considered as alternative candidates, namely Agus Harimurti Yudhoyono, Puan Maharani, Airlangga Hartanto, Ridwan Kamil, Sandiaga Uno, and Tri Rismaharini. All candidates also have the same opportunity to run as candidate pairs, which will depend on political parties' support and future coalition models.

The dynamics of political parties in election 2024 based on Twitter predictions

These political parties can get involved and participate in efforts to influence the political situation ahead of the 2024 presidential election. These political parties also use social media Twitter to build a political image long before the elections begin. This indicates that ahead of the 2024 election, political parties are already trying to influence people's political responses and attitudes. The trend in the data also shows a political contestation between nationalist political parties and

religious-based political parties ahead of the 2024 presidential election. Based on the data above, it is known that the PKS, PKB, and PAN parties are in a position that is considered to be trying to influence the dominance of the nationalist parties. Such as PDIP, Golkar, and Democrats. However, it also opens the opportunity for each of these political parties to build a political coalition in the upcoming election to win the election.

The relevance of Twitter predictions to the latest political situation in Indonesia

The relevance of these findings has the same characteristics as the current political situation in Indonesia. It highlights the potential candidate's advancement opportunities by relating several things. First, Anies Baswedan is the Governor of Jakarta, often enters the candidacy market, has political experience, and several previous periods it was known that there were always candidates who succeeded in advancing as presidential candidates after serving as Governor of Jakarta, and this can be seen from the experience of the current president, Joko Widodo. Who previously served as Governor of Jakarta. Second, Prabowo is a former candidate in the previous two presidential elections. However, losing Prabowo is possible to run in the 2024 election armed with a senior politician and chairman of the Gerindra party. Third, Ganjar Pranowo has become a new figure widely associated with running for the presidential election based on surveys. The three potential candidates are also actively using Twitter social media (Rasyid et al., 2021), (Postill, 2018).

The relevance of Twitter's predictions about political parties ahead of the general election also raises the possibility of a similar situation in the previous election. In the last election, it was widely observed that Indonesia was experiencing a political contestation that gave rise to debates on religious sentiments. This situation encourages political parties to seek to form strategic positions to influence public support. This tendency has resulted in political debates between religious-based political parties and nationalist political parties (Bourchier, 2019). The situation in the previous election also allowed the two-party bases to form a coalition, so the relevance of Twitter's predictions about a contestation between the two-party floors, whether religious-based parties or nationalist parties, might be repeated, but also has the potential to form a political coalition.

Conclusions

It turns out that Twitter social media can map the potential of candidates and political parties in the 2024 presidential election in Indonesia. Social media Twitter can predict candidates who have a solid chance to run as official candidates, including Anies Baswedan, Prabowo, and Ganjar Pranowo. The three candidates have the most dominant number of frequencies among the other candidates. The results of the mapping of political parties predict that there will be political contestation between nationalist political parties and religious-based political parties ahead of the 2024 presidential election. This is based on the number of frequencies PKS, PKB, and PAN parties are in a position that allows them to influence the dominance of nationalist parties such as PDIP, Golkar, and Democrats. Nevertheless, both the names of the candidates who appear are

considered to have still the opportunity to advance as candidate pairs and political parties that can still form a coalition with each other in the 2024 presidential election.

Overall, this study's results indicate a statistically significant relationship between the number of references on the online network, the likelihood of the situation in the election, and the outcome of the upcoming election. However, it is realized that there is another certainty that may be more accurate by considering the results of the official implementation by the election commission. This research's contribution is an essential reference in the following study related to the 2024 presidential election in Indonesia. The limitation of this study lies in the research method that only analyzes using specific social media platforms, so further research is needed that can analyze data sources on other social media platforms.

Disclosure Statement

Following Taylor & Francis policy and our ethical obligations as researchers, we report that we have no financial interest that might be affected by the research reported in the attached paper.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors

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References

Abramowitz, A. (2001). The time for change model and the 2000 election. *American Politics Research*, *29*(3). https://doi.org/10.1177/1532673X01293004

Ahmed, S., Jaidka, K., & Skoric, M. M. (2016). Tweets and votes: A four-country comparison of volumetric and sentiment analysis approaches. *Proceedings of the 10th International Conference on Web and Social Media, ICWSM 2016*.

Awais, M., Hassan, S. U., & Ahmed, A. (2021). Leveraging big data for politics: predicting general election of Pakistan using a novel rigged model. *Journal of Ambient Intelligence and Humanized Computing*, *12*(4), 4305–4313. https://doi.org/10.1007/s12652-019-01378-z

Bermingham, A., & Smeaton, A. F. (2011). On Using Twitter to Monitor Political Sentiment and Predict Election Results. *Psychology*.

Billingsley, J., Lieberman, D., & Tybur, J. M. (2018). Sexual Disgust Trumps Pathogen Disgust in Predicting Voter Behavior During the 2016 U.S. Presidential Election. *Evolutionary Psychology*, *16*(2), 1–15. https://doi.org/10.1177/1474704918764170

Boulianne, S. (2019). Revolution in the making? Social media effects across the globe. *Information Communication and Society*, *22*(1), 39–54. https://doi.org/10.1080/1369118X.2017.1353641

Bourchier, D. M. (2019). Two Decades of Ideological Contestation in Indonesia: From Democratic Cosmopolitanism to Religious Nationalism. *Journal of Contemporary Asia*, *49*(5), 713–733. https://doi.org/10.1080/00472336.2019.1590620

Buccoliero, L., Bellio, E., Crestini, G., & Arkoudas, A. (2020). Twitter and politics: Evidence from the US presidential elections 2016. *Journal of Marketing Communications*, *26*(1), 88–114. https://doi.org/10.1080/13527266.2018.1504228

Budiharto, W., & Meiliana, M. (2018). Prediction and analysis of Indonesia Presidential election from Twitter using sentiment analysis. *Journal of Big Data*, *5*(1), 1–10. https://doi.org/10.1186/s40537-018-0164-1

Burnap, P., Gibson, R., Sloan, L., Southern, R., & Williams, M. (2016). 140 characters to victory?: Using Twitter to predict the UK 2015 General Election. *Electoral Studies*, *41*. https://doi.org/10.1016/j.electstud.2015.11.017

Cameron, M. P., Barrett, P., & Stewardson, B. (2016). Can Social Media Predict Election Results? Evidence From New Zealand. *Journal of Political Marketing*, *15*(4), 416–432. https://doi.org/10.1080/15377857.2014.959690

Campbell, J. E., Cherry, L. L., & Wink, K. A. (1992). The convention bump. *American Politics Research*, *20*(3). https://doi.org/10.1177/1532673X9202000302

Campbell, J. E., & Wink, K. A. (1990). Trial-heat forecasts of the presidential vote. *American Politics Research*, *18*(3). https://doi.org/10.1177/1532673X9001800301

Ceron, A., Curini, L., Iacus, S. M., & Porro, G. (2014). Every tweet counts? How sentiment analysis of social media can improve our knowledge of citizens' political preferences with an application to Italy and France. *New Media and Society*, *16*(2). https://doi.org/10.1177/1461444813480466

Chauhan, P., Sharma, N., & Sikka, G. (2021). The emergence of social media data and sentiment analysis in election prediction. *Journal of Ambient Intelligence and Humanized Computing*, *12*(2), 2601–2627. https://doi.org/10.1007/s12652-020-02423-y

Chung, J., & Mustafaraj, E. (2011). Can collective sentiment expressed on twitter predict political elections? *Proceedings of the National Conference on Artificial Intelligence*, *2*.

Feezell, J. T. (2018). Agenda Setting through Social Media: The Importance of Incidental News Exposure and Social Filtering in the Digital Era. *Political Research Quarterly*, *71*(2), 482–494. https://doi.org/10.1177/1065912917744895

Gayo-Avello, D. (2011). Don't turn social media into another "literary digest" poll. *Communications of the ACM*, *54*(10). https://doi.org/10.1145/2001269.2001297

Gayo-Avello, D. (2013). A Meta-Analysis of State-of-the-Art Electoral Prediction From Twitter Data. *Social Science Computer Review*, *31*(6). https://doi.org/10.1177/0894439313493979

Grover, P., Kar, A. K., Dwivedi, Y. K., & Janssen, M. (2019a). Polarization and acculturation in US Election 2016 outcomes – Can twitter analytics predict changes in voting preferences. *Technological Forecasting and Social Change*, *145*, 438–460. https://doi.org/10.1016/j.techfore.2018.09.009

Grover, P., Kar, A. K., Dwivedi, Y. K., & Janssen, M. (2019b). Polarization and acculturation in US Election 2016 outcomes – Can twitter analytics predict changes in voting preferences. *Technological Forecasting and Social Change*, *145*. https://doi.org/10.1016/j.techfore.2018.09.009

Heredia, B., Prusa, J. D., & Khoshgoftaar, T. M. (2018). Social media for polling and predicting United States election outcome. *Social Network Analysis and Mining*, *8*(1), 1–16. https://doi.org/10.1007/s13278-018-0525-y

Holbrook, T. M., & Desart, J. A. (1999). Using state polls to forecast presidential election outcomes in the American states. *International Journal of Forecasting*, *15*(2). https://doi.org/10.1016/S0169-2070(98)00060-0

Jaidka, K., Ahmed, S., Skoric, M., & Hilbert, M. (2019). Predicting elections from social media: a three-country, three-method comparative study. *Asian Journal of Communication*, *29*(3), 252–273. https://doi.org/10.1080/01292986.2018.1453849

Kušen, E., & Strembeck, M. (2018). Politics, sentiments, and misinformation: An analysis of the Twitter discussion on the 2016 Austrian Presidential Elections. *Online Social Networks and Media*, *5*, 37–50. https://doi.org/10.1016/j.osnem.2017.12.002

Le, H., Boynton, G. R., Mejova, Y., Shafiq, Z., & Srinivasan, P. (2017). Bumps and bruises: Mining presidential campaign announcements on Twitter. *HT 2017 - Proceedings of the 28th ACM Conference on Hypertext and Social Media*. https://doi.org/10.1145/3078714.3078736

Lewis-beck, M. S., & Rice, T. W. (1982). Presidential popularity and presidential vote. *Public Opinion Quarterly*, *46*(4). https://doi.org/10.1086/268750

Liu, R., Yao, X., Guo, C., & Wei, X. (2021). Can We Forecast Presidential Election Using Twitter Data? An Integrative Modelling Approach. *Annals of GIS*, *27*(1), 43–56. https://doi.org/10.1080/19475683.2020.1829704

Metaxas, P. T., Mustafaraj, E., & Gayo-Avello, D. (2011). How (Not) to predict elections. *Proceedings - 2011 IEEE International Conference on Privacy, Security, Risk and Trust and IEEE International Conference on Social Computing, PASSAT/SocialCom 2011*. https://doi.org/10.1109/PASSAT/SocialCom.2011.98

Nasukawa, T., & Yi, J. (2003). Sentiment analysis: Capturing favorability using natural language processing. *Proceedings of the 2nd International Conference on Knowledge Capture, K-CAP 2003*. https://doi.org/10.1145/945645.945658

Paul, D., Li, F., Teja, M. K., Yu, X., & Frost, R. (2017). Compass: Spatio temporal sentiment analysis of US election what twitter says! *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, *Part F129685*. https://doi.org/10.1145/3097983.3098053

Postill, J. (2018). Populism and social media: a global perspective. *Media, Culture and Society*, *40*(5), 754–765. https://doi.org/10.1177/0163443718772186

Rasyid, S. B. A., Nurmandi, A., Suswanta, Mutiarin, D., & Salahudin. (2021). Public Communication of Local Government Leaders: A Case Study of Three

Major Governors in Indonesia. In *Advances in Digital Science* (pp. 487–497). Springer, Cham. https://doi.org/https://doi.org/10.1007/978-3-030-71782-7_43

Sang, E., & Bos, J. (2012). Predicting the 2011 dutch senate election results with twitter. *Proceedings of the Workshop on Semantic Analysis in …*, *53*.

Singh, P., Sawhney, R. S., & Kahlon, K. S. (2017). Predicting the outcome of spanish general elections 2016 using twitter as a tool. *International Conference on Advanced Informatics for Computing Research*, 73–83. https://doi.org/10.1007/978-981-10-5780-9_7

Sung, Y. M., Park, J., Kim, S., Kim, J., Park, J., Ha, H., Bae, J. Y., Kim, S., & Baek, D. (2016). A Balanced Survey on Election Prediction using Twitter Data. *Nature Genetics*, *48*(12).

Swamy, S., Ritter, A., & de Marneffe, M. C. (2017). "I have a feeling trump will win.....": Forecasting winners and losers from user predictions on twitter. *EMNLP 2017 - Conference on Empirical Methods in Natural Language Processing, Proceedings*. https://doi.org/10.18653/v1/d17-1166

Wang, H., Can, D., Kazemzadeh, A., Bar, F., & Narayanan, S. (2012). A System for Real-time Twitter Sentiment Analysis of 2012 U.S. Presidential Election Cycle. *Proceedings of the 50th Annual Meeting of the Association for Computational Linguistics*, *July*. https://doi.org/10.1145/1935826.1935854

Wang, L., & Gan, J. Q. (2017). Prediction of the 2017 French election based on Twitter data analysis. *2017 9th Computer Science and Electronic Engineering Conference, CEEC 2017 - Proceedings*. https://doi.org/10.1109/CEEC.2017.8101605

Yaqub, U., Chun, S. A., Atluri, V., & Vaidya, J. (2017). Analysis of political discourse on twitter in the context of the 2016 US presidential elections. *Government Information Quarterly*, *34*(4). https://doi.org/10.1016/j.giq.2017.11.001

Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Health and treatment of diabetes mellitus. *International Journal of Health Sciences*, *5*(1), i-v. https://doi.org/10.53730/ijhs.v5n1.2864

Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). The COVID-19 pandemic. *International Journal of Health Sciences*, *5*(2), vi-ix. https://doi.org/10.53730/ijhs.v5n2.2937

Mediastari, A. A. P. A. (2020). Local wisdom traditional medicine for the health and beauty of postpartum mother in Denpasar City, Bali Province, Indonesia. International Journal of Health & Medical Sciences, 3(1), 65-71. https://doi.org/10.31295/ijhms.v3n1.149