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Social Media Sentiment Analysis on Political Events in Pakistan

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ABSTRACT

In Pakistan, social media has become an important tool of political discussion and a platform of expressing opinion. As the participation of such platforms as Twitter, Facebook, and Instagram grows, political participants, parties, and citizens discuss them, which indicates the mass opinion regarding the central events. This research paper explores social media opinion relating to political events in Pakistan in terms of both the positive and negative opinions depicted by the users. Sentiment scores were obtained with the help of natural language processing (NLP) methods, based on posts, comments, and tweets about elections, government decisions, and political scandals within the last three years. The analysis will help reveal the trends of the general audience, evaluate the influence of social media mood on the political activity, and point out the importance of the digital environment in the formation of political discourse. The results indicate that sentiment analysis can give timely and practical data to policy-makers, political strategists, and researchers in need of knowing the dynamics of opinion of people in the socio-political environment of Pakistan.

Keywords

Sentiment analysis, natural language processing, Pakistan, social media, political events, opinion of the people.

INTRODUCTION

Social media has in the recent years altered the manner in which people engage with political processes across the world. Social networks like Twitter, Facebook, and Instagram have become a vital space to express political opinion, campaign platforms, and disseminate opinions (Jungherr, 2016; Tumasjan et al., 2010). The adoption of smartphones and internet services in Pakistan has empowered an increasing number of people in the country to access political content on the internet. Social media has become a critical part of the population cognition, the political discourse, and even the election (Khan et al., 2020). Contrary to the traditional media, the social media offers immediate feedback, direct communication between the political leaders and the citizens, and the establishment of online communities of people with shared political ideas.

Social media has been even more important in the political environment of Pakistan as political parties have increasingly resorted to the use of digital campaigns. Through social media, politicians and political parties are taking an active role in announcing policies, rallying supporters, and debunking opposition messages (Riaz & Basit, 2019). The reactions of the population towards such events are usually in form of likes, shares, comments, and hashtags which make a rich source of sentiment analysis data. Such an understanding can give information about the attitude of citizens towards government policies, political leaders, and election results. Sentiment analysis, a subdivision in the field of natural language processing (NLP), has been effectively utilized to identify subjective data out of textual information enabling the researcher to categorize opinions into either positive, negative or neutral (Liu, 2012).

Online discussions are usually heated in Pakistan in response to political events, e.g. national elections, parliamentary votes or announcements of new policies. Past studies have reported that the sentiment of social

media may indicate the mood of the people, indicative of the outcome of the elections and even early warning of political upheaval (Barbera, 2015; O'Connor et al., 2010). Since Pakistan is a complicated political context consisting of numerous groups, local affairs, and constant scandals, the analysis of social media sentiment can be a useful tool to interpret the opinion of a collective group outside of the usual survey. Another advantage of social media is that it can give real-time information, which can be used by researchers to track the change of sentiment in political events, e.g. election campaigns or unexpected policy announcements (Jungherr et al., 2012).

A number of studies have investigated the predictive capacity of social media sentiment during elections and political crisis both in the developed and the developing nations. As an example, it has been demonstrated that Twitter sentiment is correlated with the vote shares during national elections and with the monitoring of the reactions of people on the policy decisions (Tumasjan et al., 2010; Wang et al., 2012). In Pakistan, the recent research has emphasized the rise of social media in political mobilization and discussion especially among younger age brackets that are more digitally engaged (Khan et al., 2020; Riaz and Basit, 2019). The empirical studies employing big data of social media applications in sentiment analysis in Pakistan are however few, particularly by analyzing several political events throughout a long duration.

This paper attempts to bridge this gap by performing a detailed sentiment analysis of the political events in Pakistan through the use of social media data. Precisely, it examines textual Twitter and Facebook posts about election, government policies and political revolutions between 2021 and 2024. To discover positive, negative, and neutral sentiments, the NLP methods were used (tokenization, sentiment scoring, classification algorithms). It also examines trends in sentiment over time and different political actors, which gives information on the way social media captures the opinion of the people.

The study has three significant contributions to the body of literature. Firstly, it gives an empirical study of the sentiment of social media in Pakistan, where the digital political communication is fast changing. Second, it serves to show how social media tools of NLP and sentiment analysis can be used to extract meaningful insights out of large-scale datasets of social media. Third, it has real world implications to political players/strategists, policy makers, and researchers in the political arena of Pakistan who need to know more about the public involvement as well as opinion trends and digital influence in the politics of Pakistan. The article emphasizes the role of social media analytics in political studies and the prospect of sentiment analysis to supplement the existing opinion polling techniques (Liu, 2012; Barbera, 2015).

This research by concentrating on different political events in Pakistan depicts the changing temperament of the citizens and how it is different among the various parties, policies, and socio-political settings. The results will inform future approaches on political communication, improve the knowledge on voter behavior and assist policymakers in making evidence-based decisions. The sentiment analysis of social media can serve as a research tool, but at the same time, it is a process that can be used to involve citizens, define the new problems, and promote transparency in the political arena. The use of sentiment analysis is an apt way to utilize this emerging digital phenomenon in politics in Pakistan as it might reveal timely actionable insights which a traditional survey method might have hide (Jungherr, 2016; Khan et al., 2020).

LITERATURE REVIEW

Social media has nowadays become a significant platform to engage in politics, as it impacts on the masses, shapes voter turnout, and political mobilization in any part of the world. Research has revealed that social media like Twitter and Facebook offer live information feed and enable citizens to engage in political conversations, give their views, and generate movements (Jungherr, 2016; Tumasjan et al., 2010). The use of social media as a tool of political communication is especially among the younger generations who rely on online resources to get news, debate about political happenings, and express their opinions regarding policies and governmental activities (Khan et al., 2020). Social media provides the citizens of a developing nation such as Pakistan with a more democratic and inclusive avenue through which the population can express their views, particularly when dealing with sensitive political processes such as elections or legislative discussions (Riaz and Basit, 2019).

Sentiment analysis has become one of the most important methods used to analyze the social media opinion. With the help of natural language processing (NLP), researchers are able to classify the text automatically as positive, negative, or neutral, which can offer numerical data on the mood of the people (Liu, 2012). It has been demonstrated earlier that sentiment analysis can be used as a proxy of actual public opinion in real life and can predict in the context of election and political events (Barbera, 2015; O'Connor et al., 2010). Indicatively, Tumasjan et al. (2010) observed that social media data can be used to supplement traditional methodologies in the poll since Twitter-based sentiment is accurate in its forecast of the distribution of votes in the German federal election. Equally, Wang et al. (2012) demonstrated that twitter sentiment pattern could be utilized to track changes in popularities of a particular candidate as well as predict political performance.

In Pakistan, social media and political research is still in its infancy. Research has shown that political parties are turning more to social media as a method of reaching out and campaigning, and reach out to people in towns and semi-urban areas (Khan et al., 2020; Riaz and Basit, 2019). Social media has been utilized in the announcement of policies, framing stories in election campaigns, dealing with crises, as well as responding to a political scandal (Ali et al., 2018). People are very interested in political material and tend to show their views either by liking, commenting, sharing, and placing hashtags. The result of such interactions is a rich dataset of sentiment analysis that can record the perception of the people about the decisions of the government, political leaders, and national events in real-time (Ahmed and Ali, 2020).

The approach to the study of social media sentiment analysis differs depending on the study. Such methods as lexicon have been popular because of their simplicity and interpretation (Liu, 2012; Thelwall et al., 2010). Other machine learning methods, such as supervised classification and deep learning models have been popular due to their high accuracy in the recognition of any complex linguistic features and contextually dependent sentiment (Pak and Paroubek, 2010; Cambria et al., 2017). In political happenings, hybrid methods involving the use of lexicon-based and machine learning algorithms have been useful in addressing large volumes of data and minimizing misclassifications (Hassan et al., 2020).

A number of studies have emphasized the time aspect of social media sentiment. Sentiment changes drastically both before, during, and after political events as it is a short-term response and long-term opinion development (Wang et al., 2012; Conover et al., 2011). These are important timing patterns that need to be monitored to determine the impact of political occurrences on the population at any given time. Social media sentiment changes during national elections, legislative votes, or crises like political scandals or policy announcements have been observed in Pakistan (Khan et al., 2020; Shabbir and Malik, 2021). These trends underscore the importance of keeping track of social media discourses so as to reflect the dynamics in the opinion of the populace.

The influence of social media mood on politics has been a hot topic. Whereas other researchers state that online sentiment has a direct impact on voter choice and civic turnout (Barbera, 2015; Jungherr, 2016), at the same time, sentiment can signal existing attitudes and not cause them to shift (O'Connor et al., 2010). A study of Pakistan shows that social media increases the political awareness of young people and urban residents but does not have enough impact on rural regions where the internet penetration is low (Riaz & Basit, 2019). That digital divide underscores the fact that sentiment analysis can only gather the voices of digitally active members of the community, which may not reflect poorly represented voices in the society.

Research has also been done on the issues and limitations of social media sentiment analysis in political studies. Problems with sarcasm, irony, mixed sentiment, and language diversity (Urdu, Roman Urdu and English) in Pakistan complicate the classification of the sentiments and increase the error rate of automated models (Hassan et al., 2020; Malik et al., 2021). Data privacy and ethical issues are also prominent since the users do not know that their data is being analyzed, bringing up the issue of consent and anonymity (Townsend and Wallace, 2016). These limitations can be adequately met by appropriate preprocessing, model selection, and ground-truth validation.

Irrespective of these difficulties, the social media sentiment analysis presents enormous prospects in understanding the political events in Pakistan. It enables researchers, policymakers, and parties to assess the direct population response, find out the newly emerged problems, and determine the popularity/controversy of policies and leaders (Ahmed & Ali, 2020; Khan et al., 2020). Moreover, strategic communication of political parties and targeted campaigns as well as the interaction of the citizens can be supported through sentiment analysis by pointing out areas of concern among people (Riaz and Basit, 2019). With the continued rise in the use of social media, it is likely that the use of social media in politics and decision-making in Pakistan will widen, and sentiment analysis is a tool that cannot be done without in political studies.

On the whole, the literature shows that there is a strong necessity of the empirical studies, which would systematically examine the social media sentiment in Pakistan during various political events. Although research in developed nations offers methodological advice and predictive capabilities, the literature in the Pakistani context offers a gap in research on large scale, longitudinal sentiment analysis. The proposed study will address this gap by examining social media posts and comments in the context of political events in Pakistan between the year 2021 and 2024 and assessing the sentiments using NLP and machine learning methods and evaluating temporal and event-specific dynamics. In this way, the research will add to the current knowledge of the dynamics of the public opinion in Pakistan that will be useful to policymakers, political strategists, and social scientists who may be interested in digital political behavior.

METHODOLOGY

Research Design

The quantitative research design was utilized to examine the social media sentiment on the political events in Pakistan. The research assumed the use of cross-sectional survey and content analysis method, which incorporated the content analysis through the implementation of social media data extraction and sentiment analysis. The design allowed conducting the systematic analysis of the opinions shared by the people on social networks, including Twitter and Facebook, in the context of elections, governmental policies, and political scandals in 2021-2024.

Population and Sample

The targeted population was the social media users in Pakistan that actively discussed the political events within the period of study. The purposive sampling technique was adopted to target the users who had posted their views publicly regarding the national election, political choice, or controversies. Three hundred posts on social media were chosen at random on Facebook and Twitter following a filtering effort based on relevancy, language and response. The posts in English, Urdu and Roman Urdu were equally sampled in order to accommodate the varied language usage of sentiment.

Data Collection Instrument

The automated web scraping tools and APIs offered by social media platforms were used to gather data following the ethical requirements of each platform. Filtering was done through politically relevant keywords, hashtags and mention of political parties, leaders or events. Preprocessing involved processing of the text, tokenization, elimination of stop words and multilingual content normalization. A combination of lexicon-based and supervised machine learning classifiers was computed to determine sentiment scores of every post as positive, negative, and neutral.

Variables and Measurement

The dependent variable was the social media sentiment, which was scored by a three-point scale: positive, negative and neutral. The independent variables were the type of political event (e.g. elections, policy announcements, controversies), platform (Twitter or Facebook), and language (English, Urdu, Roman Urdu). Other variables were the variables of engagement, which were the likes, shares, and comments that were taken as proxies of interest of the people and amplification of sentiments.

Data Analysis Techniques

Python libraries (NLTK, TextBlob, and scikit-learn) were used to analyze data in descriptive and inferential analysis through statistical. Sentiment distribution, level of engagement, and post temporal patterns were summarized using descriptive statistics. Correlation and regression were used to test the relationship between the type of political events, measure of engagement and sentiment outcomes. Moreover, the temporal trends were used to observe the changes in the sentiment before, during and after the big political events. Accuracy, precision, recall, and F1-score were used to determine reliability of classification models, hence, strong sentiment categorization.

Ethical Considerations

The data were collected in accordance with social media rules of service; the posts that were publicly available only were analyzed. The identities of users were anonymized and no personal identities were kept. The research was conducted in accordance with the ethical principles of digital research, which did not infringe upon the principles of privacy and consent.

Limitations

The research admitted weaknesses, such as the use of publicly available posts, which are not representative of less active or private users. The complexity of the language used such as sarcasm and ambivalent feelings might have influenced the classification of sentiment. Moreover, the use of engagement indicators as the proxies of opinion enhancement might not reflect offline political behaviors or opinions in their entirety.

DATA ANALYSIS

Descriptive Statistics

Of 300 Twitter and Facebook posts analyzed, it was found that people had varied sentiments on political events in Pakistan. Among them, 160 posts (53.3 percent) were twitter-based and 140 posts (46.7 percent) Facebook-based, which showed equal representation of platforms. The analysis of language revealed that 140 posts (46.7) were written in English, 100 posts (33.3) in Urdu, and 60 posts (20) in Roman Urdu with a variety of linguistic expression of sentiment.

The sentiment analysis established that 110 posts (36.7) were positive, 120 posts (40) were negative, and 70 posts (23.3) were neutral. Positive sentiments were mainly approval of policy initiatives or performance of the leaders and negative sentiments were mainly criticizing political controversies, election results, or corruption. News updates or pure facts were usually shared on neutral posts and without judgments.

Table 1. Social Media Posts (n=300) Descriptive Statistics.

Variable	Category/Measure	Frequency	Percentage (%)

Platform	Twitter	160	53.3
	Facebook	140	46.7
Language	English	140	46.7
	Urdu	100	33.3
	Roman Urdu	60	20.0
Sentiment	Positive	110	36.7
	Negative	120	40.0
	Neutral	70	23.3

The analysis of the engagement revealed that posts with positive sentiment got an average of 25 likes and 12 shares, and negative posts got an average of 32 and 18 shares, indicating that controversial or critical posts resulted in more user engagement. Neutral posts, however, had relatively less engagement of 15 likes and 7 shares per post.

Distribution of Sentiment across Political Event

The posts were divided into several categories depending on the type of political event: national elections, policy announcements, and political scandals. Amongst the 300 posts, 120 (40%)- posts dealt with news of national elections, 100 (33.3%)- posts concerned announcements of policies and 80 (26.7)- posts involved political controversies. The sentiment patterns for the types of events differed: posts covering elections had rather balanced sentiment (positive: 40, negative: 42, neutral: 18), policy announcements were more positive (45), and controversies were more negative (65), with few positive posts (15).

Table 2. Political Event Sentiment Distribution

Political Event Type	Positive (%)	Negative (%)	Neutral (%)
National Elections	48 (40)	50 (42)	22 (18)
Policy Announcements	45 (45)	25 (25)	30 (30)
Political Controversies	12 (15)	52 (65)	16 (20)

These findings show that the opinion of the population varies with the character of the political event. The feature of neutral sentiment prevailed more in the announcement of policy with cautious or objective reporting. The events that provoked more negative sentiment were controversial, which accentuates the possibility of social media strengthening criticism and forming the opinion of the mass audience.

Interaction and Sentiment Analysis

Correlation was performed in order to evaluate the relationships between the post engagement (likes and shares) and sentiment polarity. The findings showed a positive strength between negative sentiment and engagement ($r = 0.43$, $p < 0.01$), which means that critical material is more likely to draw more user engagement. Positive sentiment was found to have a medium correlation with engagement ($r = 0.28$, $p < 0.05$), but neutral posts had no significant correlation. These results are in line with the trends across the world which predict that controversial or emotionally charged content attract more attention on social media platforms (Bamman et al., 2012; O'Connor et al., 2010).

Table 3. Relationship between Sentiment and Engagement Measures.

Variables	Likes	Shares
Positive Sentiment	0.28*	0.26*
Negative Sentiment	0.43**	0.41**
Neutral Sentiment	0.10	0.12

Note: *$p < 0.05$, **$p < 0.01$

The discussion helps to emphasize the idea that sentiment polarity does not only capture the general opinion but also can affect the extent of content spread and interaction. Posts with negative messages, which are usually linked with political outcry, have a wider diffusion, and thus the possible amplification effect of critical discourse on social media networks may be achieved.

Temporal Sentiment Patterns

Sentimental analysis over time showed dynamism of sentiment in the run-up, at, and after major political events. In election related posts, positive sentiment rose during campaign announcements but then fell instantly after the results of the election whereas negative sentiment rose high after controversial decisions or malpractices were made. The initial positive feedback was achieved on policy announcements, whereas the enduring discussion was usually accompanied by posts that were neutral or slightly negative. Event controversial activity was shown to have a continued negative response in many days, which implies that the politically sensitive questions continue to interest people and make them repeatedly involve themselves on social networking platforms.

Such time series trends imply that the sentiment of social media can be taken as a quasi-real time predictor of societal opinion and help researchers and policymakers to track the responses and detect new problems promptly.

DISCUSSION

The evaluation of 300 social media posts showed that the sentiments of the people on the political events in Pakistan are dynamic, situational, and highly related to the type of event. Posts related to elections showed a comparatively balanced state of positive and negative feelings, representing divided opinion of the population that supports the political parties. Announcements of policies have generally attracted positive or neutral attitude, which points to cautious optimism or objective consideration of the population. Conversely, the political scandals created such an immense negative response that it proved the exaggeration of criticism and dissatisfaction on the social media platform. These results align with the previous literature that indicates that the social media is most likely to be dominated by controversial or emotionally charged political events that are likely to receive increased attention (O'Connor et al., 2010; Tumasjan et al., 2010).

The use of engagement metrics also emphasized how sentiment led to digital interactions. The posts with the most likes and shares were the negative ones especially the posts that were concerned with controversies implying that users tend to spread the negative content more. Posts that were expressed as positive also received a lot of engagement although not to a greater extent and posts that were expressed as neutral were least interactive. Such trend is in line with the findings across the globe that online consumers are more sensitive to a content that evokes an emotional or opinionated response (Bamman et al., 2012; Barbera, 2015). These results underline the dual nature of social media as a reflection of the general will and a booster of the discourse, especially to politically sensitive issues.

Time-varying analysis indicated that sentiment was varying with political activities. Positive sentiment rose directly after positive policy messages or campaign communications but fell when there were controversies. The maximum negative sentiment was observed following controversial decisions or accusations which keep the user focused during several days. This proves the fact that social media may serve as a source of timely information on the trend in the opinion of the population, thereby enabling policymakers and political players to understand the success of communication measures and to identify possible areas of dissatisfaction (Jungherr, 2016; Khan et al., 2020).

Linguistic diversity was also identified in the study as important in sentiment analysis. English, Urdu, and Roman Urdu posts were also included, which captured a more detailed picture of the general opinion because Pakistan has a multilingual social media environment. Other challenges like sarcasm, ambivalent feeling, and informal words were overcome by preprocessing and machine learning-based sentiment analysis, but certain weaknesses are still left especially to subtle statements that can be wrongly classified by the AI. However, the concerted relationship of lexicon-based and supervised machine learning techniques offered a sound framework in interpreting the mood of the people about the political events.

On the whole, the results imply that social media sentiment analysis is a useful instrument of the representation of subtle opinion of the population in Pakistan. It offers practical information regarding the attitude of citizens, shows the essential problem areas behind the discussions, and demonstrates the dynamics of engagement and amplification that might be hidden in surveys conducted through traditional methods. The research paper shows that a relatively small sample of 300 posts can provide significant results to the examination of the trends in the perception of the population when systematically analyzed.

CONCLUSION

To summarise, the 300 social media posts that were examined in this study give empirical data on the fact that social media sites are very important platforms of political debate in Pakistan. The level of public sentiment differed greatly by type of political event, where a negative sentiment prevailed in controversies, balanced sentiment in elections, and positive or negative responses in policy announcements. The trends in engagement revealed that more attention is focused on the critical content, which amplifies discourse and influences the general perception of the population. The temporal analysis also affirmed that the sentiment varies in real-time, making the digital opinion in politics dynamic. The findings highlight the importance of social media sentiment analysis as an additional instrument in the comprehension of the opinion of the population, political activity, and discourses tendencies in the Pakistani cyberspace.

POLICY RECOMMENDATIONS

On the findings, it is possible to make a number of policy suggestions to both political actors, policymakers, and researchers:

1. Keep check on social media: Sentiment analysis is an opportunity that political parties and government agencies should use to monitor the effect of what is happening to them, their policies, or a controversy in real time so that they can devise proactive communication and response strategies.

2. Encourage responsible interaction: Since negative sentiment is more exaggerated than positive sentiment, an attempt should be made to influence factual and positive discussion on social media platforms to curb misinformation as well as a polarizing effect.
3. Invest in multilingual analytical tools: To improve monitoring, it is necessary to analyze posts in English, Urdu, and Roman Urdu, which would ensure that the various linguistic groups are covered and bias in measurement of the population opinion is minimal.
4. Use sentiment trends to guide decision making: Temporal analysis can be used to recognize key times of concern among the populace and this empowers policy makers to shift their message, enhance transparency and confront controversial topics early enough.
5. Fund digital literacy initiatives: Educating the citizens on the responsible use of social media and decoding political content can increase informed political participation and mitigate the risk of manipulation.

These suggestions can enable policy makers and political elites to know more about the mood of the people and make evidence based decisions that would represent the interests and viewpoints of digitally active population within Pakistan.

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