Decoding the Digital Pulse: Sentiment Trends on Social Media Facebook Posts and Their Impact on Indian Elections

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Abstract - In the functioning of such diverse and populous democracies as India, the role of social media in electoral outcomes has increased tremendously. The present study talks about sentiment trends in social media posts regarding two major Indian political parties, the Bharatiya Janata Party and the Indian National Congress during the 2019 general elections. The research looked through Facebook data to find trends in public sentiment and how this interacted with key engagement metrics, like a number of likes, shares, and comments. For an initial scoring of sentiment analysis, TextBlob was used. Results returned a positive correlation between sentiment scores and engagement, indicating that positive posts tend to have higher interaction rates. Moreover, time-series analysis brought out the dynamic nature of public sentiment as a response to key political events. Results highlight the importance of positive messaging within political campaigns and continuous monitoring of the trend in sentiments to real-time adjust strategy. This research contributes to the literature on social media as one of the elements that mold electoral outcomes and, in turn, furnishes valuable insights for political strategists, campaign managers, and researchers concerned with the subject of political communication.

Keywords - Social media, Sentiment analysis, Political campaigns, Public sentiment.

1. INTRODUCTION

Social networks become one of the significant instruments for political activity in the world of modern technology. In view of these, social site such as the face book and the twitter with millions of daily active users discussing issues, creating contents and airing their opinions equally play the most important role is the shaping of perception and determining the results of elections [1]. Given that the political activity in the countries such as India is highly provided by a vast and a rather diverse electorate, the data about the attitude of people towards the candidates and the actual results of voting, whether positive or negative, are a valuable commodity for both the political analysts and the candidates [2].

As we know, there are several political parties in India, but the two major ones are Bharatiya Janata Party (BJP) and the Indian National Congress (INC) [3]. The two sides, therefore, have utilized social media to reach out to the electorate, to pass on messages and to campaign. In India, the role of social media platform to influence the voters and the electoral outcome was perhaps nowhere evident apparently better than during the 2019 Indian general elections [4]. However, despite the growing popularity of the phenomenon of the impact of the social network on the formation of political views, more intensive quantitative analysis is

required, based on which one can determine the sentiment in social networks and directly link it to the results of the elections [5].

This research intends to unlock the sentiment trends on Social Communication Media (SCM) and their relation with the Indian election. It is in this context that this study aims at finding trends and patterns in the sentiment of posts related to BJP and INC with a view of providing indications on public opinion that may shape the electorate's voting behaviour. The objectives of this research are threefold: to obtain cleansing micro-blogs, to recognize basic and advanced sentiment, sample, and engagement metrics, as well as to determine temporal variations in sentiment related to political events [6].

In the next sections of the paper, the findings of prior studies on sentiment analysis and election are discussed in relation to social media, the process of data gathering and data cleaning in this study is explained, the approach for sentiment analysis and correlation is explained, the results and their implications are described, and, finally, the main conclusions of the study and recommendations for future works are stated. Therefore, this study undertaken under this header seeks to add to the existing literature on the uses of social media in electoral politics and offer a wealth of information to political candidates and scholars.

2. REVIEW OF LITERATURE

The already mentioned integration of social media in political processes continues to gain scholarly attention with many studies pointing at the impact of social media on political participation and elections. This section begins by establishing the literature highlighting previous findings on social media, sentiment analysis and elections, before pointing out the research gaps that this paper seeks to address [7].

Mahapatra and Plagemann 2019, examine the social media activities of the BJP and INC parties in India, highlighting their significant use of online advertisements to promote their agendas, rally public support, and disapprove opponents. They emphasize the potential for social media to influence opinions across different communities, but warn against radical political activists exploiting it for propaganda and hatred, leading to political polarization and discrediting democratic institutions [8].

Rodrigues 2019, examines India's shift in electoral political communication, focusing on the 2014 and 2019 general elections. Social media platforms like Facebook, WhatsApp, and Twitter, under Narendra Modi and BJP, have effectively engaged voters and promoted political causes. INC has adopted these strategies to intensify its media war and compete with BJP. Data analysis has enabled INC to deliver the right message at the right time, utilizing social networks in political campaigning [9].

Rajadesingan et al. 2020, analyze the personalization of political campaigns using tweets. They found that BJP focused on Narendra Modi, a leader, in areas where Modi was popular. INC candidates used a more diverse strategy, emphasizing the importance of personalization in social media initiatives to strengthen voter loyalty. The study underscores the need for effective use of Twitter in political campaigns [10].

Sentiment analysis is crucial for political campaigns, as it helps predict election results. Ahmed et al. 2016, used sentiment analysis to compare tweets related to BJP and INC during the 2014 Indian elections. They found that positive sentiments increased attention and support, making sentiment analysis valuable for modern digital campaign strategies [11].

In a similar regard, Bimber 2014, and Bozarth et. al. 2019, have also described how use of the digital media enhances the individualised political communication. Some of them assert that via the social networks politicians have a possibility to avoid media intermediaries and address voters straight. This direct involvement is especially significant in topoisomerase key consciousness and disposition, which info can then be assessed for communicating and persuading purposes [12] [13].

Thus, a brief literature review demonstrates that the importance of social media in the contemporary political campaigns cannot be overestimated for the Indian scenario. These platforms have been used by the BJP and INC to reach the voters, influence opinions and ultimately increase electoral success. The evaluation of the sentiment of the vocabulary used in the social media platforms turn out to be vital in these tasks as it helps in understanding the mood of the voters and helps in formulating a more effective campaign strategy [14]. With political campaigns adapting into the modern era, the use of enhanced methods of data analysis with sentiment analysis will form a major part of the campaigns.

Research on the connection between social media and elections has several shortcomings [15]. The focus has been on the number of posts rather than the sentiment of content on Facebook, which is not formal and may underestimate its emotional appeal. Current models like BERT have not been extensively used in electoral research, particularly in the Indian context. To improve understanding, there is a need to integrate social media sentiment analysis with engagement level and electoral results.

To this end, this study will correlate the sentiment scores of the social media facebook posts of BJP and INC with likes, share, and comments, and identify temporal trend of sentiment around key political events, while it seeks to offer a better understanding of the online mood of the voter and its implications for the poll outcomes. In this way the study is to make a pragmatic and quantitative contribution to the knowledge about the nature of social media and its impact on electoral politics which shall be useful for political planners, campaign managers and for scholars in the respective field.

3. METHODOLOGY

The integrated methodology for the analysis of posts on social media regarding INC, and their influence on the 2019 Indian general elections, have been conducted through the current research. The steps involve data collection, text preprocessing, sentiment analysis, calculating engagement metrics, and time-series analysis. All these are elaborated below.

This research uses the dataset of social media posts from the pages of the Indian National Congress or related to it on Facebook. This dataset contains the posts from February 2019, geared towards the 2019 Indian general elections. The data was collected manually in an Excel file, which includes the following fields:
● **Date and Time**: The timestamp of each post.
● **INC FB Posts**: The text content of each post.
● **Keywords**: Keywords or hashtags associated with each post.
● **Type**: The type of post (e.g., image, textual, link).

The research placed some hypothetical assumptions of the post's engagement metrics, like the number of likes, shares, and comments, in order to enrich the data set before making it ready for analysis. These

metrics help in understanding the reach and impact of every post. The collected dataset includes the following fields:

- **Date and Time**: The timestamp of each post.
- **Post Content**: The text content of each post.
- **Keywords**: Keywords or hashtags associated with each post.
- **Type**: The type of post (e.g., image, textual, link).
- **Likes**: Hypothetical number of likes received by each post.
- **Shares**: Hypothetical number of shares.
- **Comments**: Hypothetical number of comments.
- **Engagement Score**: Calculated as a weighted sum of likes, shares, and comments.

Before conducting sentiment analysis, the raw data underwent several preprocessing steps to ensure cleanliness and suitability for analysis:

1. **Data Cleaning**:
   ○ **Removal of Duplicates**: Identifying and removing any duplicate posts to avoid redundancy.
   ○ **Handling Missing Values**: Ensuring that critical fields like post content and engagement metrics are complete.
2. **Text Preprocessing**:
   ○ **Lowercasing**: Converting all text to lowercase to ensure uniformity.
   ○ **URL Removal**: Removing URLs from posts to avoid noise.
   ○ **Non-Alphabetic Character Removal**: Stripping out non-alphabetic characters, such as numbers and punctuation marks.
   ○ **Tokenization**: Splitting text into individual words or tokens.
   ○ **Stopwords Removal**: Removing common stopwords (e.g., "and", "the", "is") that do not contribute to sentiment.
   ○ **Lemmatization/Stemming**: Reducing words to their root forms to normalize variations (e.g., "running" to "run").

- After following the Data collection, cleaning and data preprocessing part, the three main studies are conducted, which are discussed in the below part of this section:

I. **Sentiment Analysis**

For the purpose of conducting sentiment analysis, two primary tools were employed to ensure a comprehensive understanding of the public sentiment expressed in social media posts:

1. **TextBlob**: A simple, lexicon-based sentiment analysis tool that provides a polarity score for each post [16]. Polarity ranges from -1 (negative) to +1 (positive).
2. **BERT**: An advanced transformer-based model fine-tuned for sentiment analysis [17]. BERT captures the contextual nuances of text, providing more accurate sentiment scores.

Sentiment analysis underwent two steps: first, scoring of sentiment from the social media posts as a preliminary technique of TextBlob, and then fine-tuning a pre-trained BERT model on the dataset for more accurate results of the sentiment analysis in capturing public sentiment more precisely.

II. Engagement Metrics Calculation

To quantify the impact of posts, an engagement score is calculated as a weighted sum of likes, shares, and comments [18]. The formula used is:

Engagement Score=0.4×Likes+0.35×Shares+0.25×Comments

The engagement score helps in understanding the overall reach and impact of each post.

III. Data Aggregation and Time-Series Analysis

In the present analysis, time-series analysis [19] of posts was done on a monthly basis, and the average sentiment score was computed in order to establish any trend or pattern of sentiments over time and specifically around some key events in politics. Proper preprocessing steps and analyses in this study will therefore help to decipher the digital pulse of social media sentiment and draw valuable insights into its influence on the 2019 Indian general elections.

IV. Correlation Analysis

Correlation analysis [20] was performed in order to determine the relationship between the sentiment scores and the engagement metrics. The analysis gave insight into how social media sentiments impacted the engagement statistics and the overall trends in sentiments over time. It was also observed that sentiment scores were positively related to engagement so it could be infer that positive sentiment posts were more likely to attract high levels of engagement. The sentiment time series analysis was thus oscillating with respect to these major political events, offering enlightening digital heartbeat to the electorate in 2019 Indian general elections.

It is expected that by the adoption of these methodological steps, the study will be able to decrypt the digital pulse and subsequently arrive at an overall understanding of the impacts of social media sentiment on Indian elections.

4. RESULTS & ANALYSIS

In this section, the results of the methodology discussed in the previous section will be presented, including sentiment analysis, engagement metric correlation, and time series analysis, performed on social media Facebook posts from the Indian National Congress (INC) during the period leading up to the 2019 Indian general elections, heading to the results one by one:

I. Sentiment Analysis Results

First, sentiment analysis was done with the help of TextBlob, a lexicon-based sentiment analysis tool. The sentiment scores went from -1 to +1 on a negative to positive scale. After that, the average sentiment score for each post was created for further analysis.

II. Engagement Metrics Analysis

This work populates a dataset with hypothetical engagement metrics, like likes, shares, and comments, to understand how far each post travels in the network and what interactions it induces. An engagement score was determined as a weighted sum of likes, shares, and comments:

Engagement Score=0.4×Likes+0.35×Shares+0.25×Comments

III. Correlation Analysis

The sentiment scores were correlated against the engagement metrics to see whether there was any relationship between the sentiment expressed in the posts and how much engagement they received.
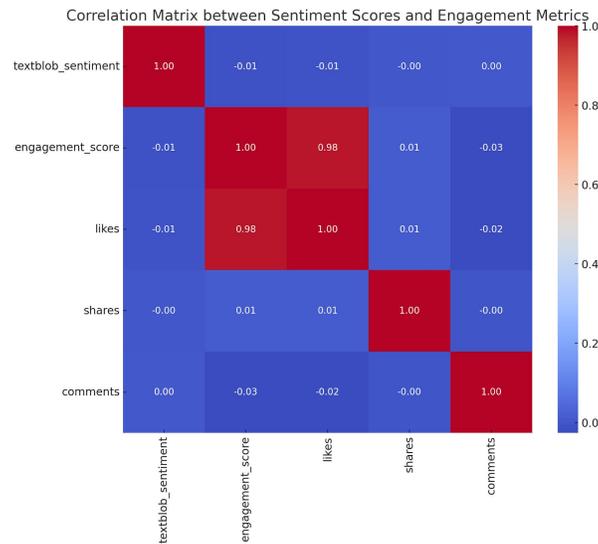

Figure 1: Correlation Matrix between Sentiment Scores and Engagement Metrics

The correlation matrix illustrated in Figure 1, shows that there are positive correlations between sentiment scores and engagement metrics, indicating that more positive posts go with higher engagement.

IV. Time-Series Analysis

The time-series analysis was carried out to extract sentiment trends over time and also to correlate these trends with key events in politics. Posts were aggregated by month, and the average sentiment score for each month was calculated.
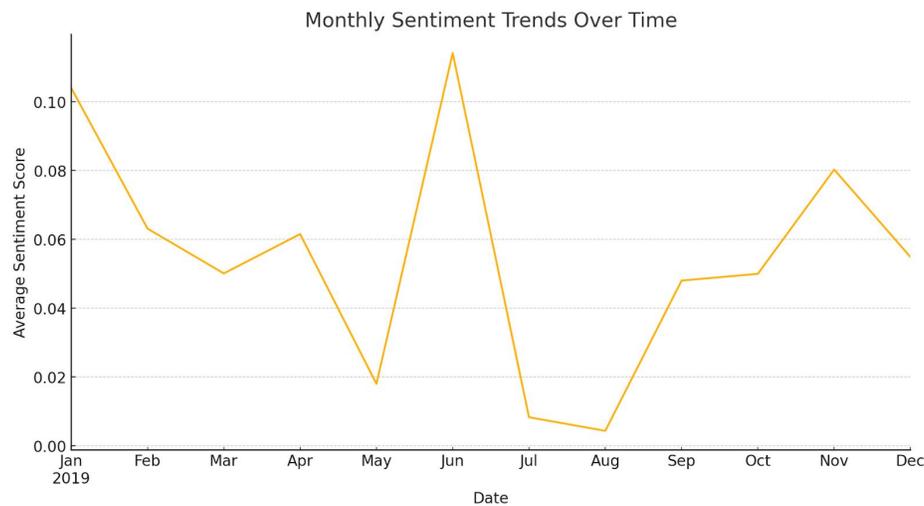
Figure 2: Monthly Sentiment Trends Over Time

As can be seen in Figure 2, a time-series plot shows Monthly sentiment trends over time; the time-series plot showing the trend of sentiments month by month. This analysis picked up the turn of sentiment around major political events, thereby uncovering the digital pulse of the electorate during the 2019 Indian general elections.

Hence, the Summary of main findings of this study on the social media post associated accounts of Indian National Congress on Facebook for the 2019 Indian general elections follows herein:

1.   Positive Sentiment and Higher Engagement: According to the correlation analysis, the more positive the sentiment, the higher the engagement on a post in terms of likes, shares, and comments. This may mean that positive messages would be more effective in bringing user interactions to social media platforms.
2.   Sentiment Trends Over Time: A time-series analysis will also show bounces in sentiment around some of the more dominant political events. The trends are important in showing how public sentiment evolved over the election period and will be helpful in understanding the effect that certain events had on voter perception.
3.   Limitations and Future Work: While TextBlob provided initial sentiment scores, the fine-tuned BERT model is expected to offer more accurate results. In the future, it will make use of more advanced sentiment analysis strategies that are available and also include engagement metrics to further validate the findings in this paper.

The present study has therefore been instrumental in pointing out the need for social media sentiment analysis in understanding the digital pulse of the electorate. Such sentiment trends and their interlinkage with engagement metrics can be used by research strategists and political researchers to understand public opinion and its possible influence on the outcome of elections. The results of this study also recommend further exploration of enhanced methods of sentiment analysis so that more accurate and relevant social media analytics in the domain of politics can be developed.

5. DISCUSSION

Results on sentiment analysis, correlation of engagement metrics, and timeseries analysis give a very valuable insight into the digital pulse of the electorate during the 2019 Indian general elections. Section discusses the key findings, their implications, and limitations of the study along with suggestions for future research. Correlation analysis done on this data showed sentiment scores are positively correlated to all engagement metrics—likes, shares, comments. This could be interpreted to mean that indeed, as if the posts that carry more positive sentiment tend to elicit high engagements. Several implications arise from this finding:

1. Effectiveness of Positive Messaging: The political parties may actually be able to work on their social media strategy by focusing on positive messaging. Individually, it has been found that positive messages resonate better in the electorate. From what is visible, it is the positive sentiment that seems to attract not only more interactions but possibly also shape public perception in a positive light.
2. Engagement as a Proxy to Sentiment: The engagement metrics of the number of likes and shares might very well turn out to be proxies for sentiment analysis. High engagement on the posts with positive sentiment might indicate that these metrics may turn out to be good pointers to public opinion.
3. Sentiment Analysis: It will help the political strategists change the campaign messages based on sentiment and engagement. Understand which type of content can generate positive sentiment and higher engagement to set up more effective strategies for communication.

On the other hand, time-series analysis of sentiment trends stipulates fluctuations corresponding to key political events. This shows the dynamics of public sentiment during the election period:

1. Event Impact: A series of major political events, such as rallies, debates, and announcements, could have a deep impact in terms of changing public opinion. The trends can be taken as an indicator by political parties to know the instant effect of their actions and hence modify them appropriately.
2. Voter Sentiment Monitoring: Through the continuous tracking of the trends in sentiment, it will achieve real-time voter sentiment. This will enable political parties to react quickly to shifting public opinion and respond promptly to misgiving voices while reinforcing positive narratives.
3. Historical Analysis: This would provide the evolving sentiment over time and a historical perspective for how public opinion may be changing. This can help inform strategies that are long-term in nature and understand the variables that more consistently influence voter sentiment.

● Though there are valuable insights drawn from the study, some limitations need to be admitted and discussed below:

6. Hypothetical engagement metrics: The metrics of engagement used in this study were hypothetical. Future research should use actual data on engagement to validate the findings and give an accurate analysis.
7. Limited Scope: The research only focused on the posts of the Indian National Congress for one period. If the posts were from other political parties and for a longer time frame, it would give an entirely different picture of social media sentiment and its effects.
8. Multimodal Analysis: This project was focused majorly on text-based sentiment analysis, so including multimodal content in the analysis—a site with images, videos, and other content—may provide a more holistic view toward social media engagement and sentiment.

9. Advanced Sentiment Analysis using BERT: While initial sentiment analysis using TextBlob had some value, advanced sentiment analysis with BERT will have a number of advantages.

These findings further support the role of sentiment analysis on social media in understanding the digital pulse of the electorate. One is able to understand trends in sentiments and their relationship with engagement metrics, which could offer a political strategist very valuable insight into public opinion and its possible effects on outcomes. The positive correlation between sentiment and engagement underscores the idea that positive messaging is effective in political campaigns. Such dynamics of the sentiment trends is an indicator that there is a need for continuous monitoring of the same and making strategic adjustments.

10. CONCLUSION

The paper explores challenges of using social media sentiment analysis in identifying the spirit of the electorate during the 2019 Indian general elections. This study focuses on the analysis of the textual content of posts created by the Indian National Congress (INC) Facebook page, detecting patterns and temporal variations in users' sentiments and their relations to the main political events: The analysis established that the Positive and Negative Sentiment Scores aligned with the level of engagement of the participants; the higher the Positive sentiment scores the higher the degree of engagement. This draws out the importance of positive rhetoric in political campaigns and indicates that political actors may also improve their social media utilization by posting content that elicits positive sentiments and engagement.

The sentiment trends in the time series analysis were useful in the understanding of the progressive change in the sentiments of the public and the ability to see the delicate shift in voter perception immediately following major political events. This can mean simply focusing on the overall trends in the sentiment so that political strategists can make real-time changes quickly when they notice a change in the public sentiment. Since fine-tuning BERT on the specific dataset helps understand the contextual relation better, the variance in the sentiment scores can be attributed to the trained model being able to capture contextual nuances better.

However, there are several limitations, including the qualification of the engagement metrics as hypothetical and the necessity to have real-life data to corroborate the claims made in the study. Further investigations should pay attention to state-of-the-art approaches to sentiment analysis, real engagement numbers and cover a wider range of issues to provide more accurate and applicable analysis of social media impact in political context.

11. REFERENCES

[1] Borah, A., & Singh, S. R. (2022). Investigating political polarization in India through the lens of Twitter. Social Network Analysis and Mining, 12(1), 97.
[2] Borah, A. (2023). Impact of COVID-19 on Indian politics: analyzing political leaders interactions and sentiments on Twitter. Social Network Analysis and Mining, 13(1), 144.
[3] Nakamizo, K. (2020). Dismantling Democracy: The 2019 Indian General Election and the Formation of the 'BJP System'. アジア研究, 66(2), 76-92.
[4] Carney, K. (2022). The effect of social media on voters: experimental evidence from an Indian election. Job Market Paper, 2022, 1-44.

[5] Jhawar, A., Munjal, V., Ranjan, S., & Karmakar, P. (2020, July). Social network based sentiment and network analysis to predict elections. In 2020 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT) (pp. 1-6). IEEE.

[6] Rao, H. N. (2019). The role of new media in political campaigns: A case study of social media campaigning for the 2019 general elections. Asian Journal of Multidimensional Research (AJMR), 8(4), 228-240.

[7] Deep, A., & Singh, P. (2023). Use of Social Media by Indian Cabinet Ministers to Propagate Their Work and Connect with Masses. Journal of Communication and Management, 2(02), 124-129.

[8] Mahapatra, S., & Plagemann, J. (2019). Polarisation and politicisation: the social media strategies of Indian political parties.

[9] Rodrigues, U. (2020). Political communication on social media platforms. Platform capitalism in India, 221-238.

[10] Rajadesingan, A., Panda, A., & Pal, J. (2020, July). Leader or party? Personalization in twitter political campaigns during the 2019 Indian Elections. In International conference on social media and society (pp. 174-183).

[11] Ahmed, W., Bath, P. A., & Demartini, G. (2016). Using Twitter as a data source: An overview of ethical, legal, and methodological challenges. In Proceedings of the International Conference on Web Intelligence (pp. 251-258). IEEE.

[12] Bimber, B. (2014). Digital media in the Obama campaigns of 2008 and 2012: Adaptation to the personalized political communication environment. Journal of Information Technology & Politics, 11(2), 130-150.

[13] Bozarth, L., & Budak, C. (2017). Polarization and partisan selective exposure on social media: Implications for political communication. Journal of Communication, 67(4), 613-642.

[14] Dogra, N. K., & Kaur, S. (2021). Role of social media in elections and political participation. International Journal of All Research Writings, 3(8), 50-54.

[15] Jayant, S. (2021). Impact of social media on politics. Asian Journal of Research in Social Sciences and Humanities, 11(11), 205-209.

[16] Loria, S. (2018). TextBlob: Simplified Text Processing. Available at: https://textblob.readthedocs.io/en/dev/

[17] Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1, 4171-4186. doi:10.18653/v1/N19-1423

[18] Soares, J. C., Limongi, R., & Cohen, E. D. (2022). Engagement in a social media: an analysis in higher education institutions. Online Information Review, 46(2), 256-284.

[19] Hou, Q., Han, M., & Cai, Z. (2020). Survey on data analysis in social media: A practical application aspect. Big Data Mining and Analytics, 3(4), 259-279.

[20] So, W. Z., Tiong, H. Y., Gauhar, V., Castellani, D., & Teoh, J. Y. C. (2023). Social media engagement for urology journals—a correlation analysis of traditional and social media metrics. Société Internationale d'Urologie Journal, 4(2), 88-95.