



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## A SYSTEMATIC REVIEW ON ELECTRONIC DEMOCRACY THROUGH TECHNIQUES OF SOCIAL MEDIA ANALYTICS

N.Suneetha<sup>1</sup>, M.James Stephen<sup>2</sup>, P.V.G.D.Prasad Reddy<sup>3</sup>

<sup>1</sup>Department of CS&SE, Andhra University, Visakhapatnam, AP, INDIA.

<sup>2</sup>Chair Professor, Dr.B.R.Ambedkar Chair, Andhra University, Visakhapatnam, AP, INDIA.

<sup>3</sup>Sr.Professor, Department of CS&SE, Andhra University, Visakhapatnam, AP, INDIA.

**ABSTRACT:** E-Democracy is a blend of the terms electronic and democracy also known as Digital or Internet democracy which bolsters political self-determination as it facilitates unceasing engagement with the target voters. India had witnessed a biggest challenge in the political sphere with the unprecedented transition from conventional mode to internet trend. Social Media Analytics in the political context contributes deeper insight about the emotional state of voters based on every mention and conversation made by the general election competitors. This paper analyzes the Indian Election System with social networking sites such as Instagram, Facebook and Twitter. Techniques of social media analytics like Sentiment Analysis, Machine Learning, influencer analysis approaches which are often cited in the research literature are discussed to measure the polarity of sentiments. The paper concludes with future potential research directions.

**Keywords:** Sentiment Analysis, Political Communication, Political Campaigning, Political Marketing, Trend Analysis, Voter Behavior Analysis, Influencer Identification

### I. INTRODUCTION

In the current days, social media has gained widespread significance by engulfing the world with its existence and had also made its mark in the political periphery. There are different kinds of social networking sites like Facebook, Twitter, Linked In, Instagram, WhatsApp, etcetera which connect people in a virtual mode. India is a Country that incorporates diverse cultures with myriads of languages establishing communication among the human race. Election is the crucial part of governance in any nation and the core democratic instrument for connecting voters with politicians. Until 2014 Indian Elections, the traditional democracy is in existence but since then, the politics of India had been associated with the digital democracy.

Indian Politics through social media accommodates direct contact with voters, advertising without paying for it, impact on young voters, fundraising, image boosting, powerful media for freedom of speech, campaigns go viral through media, tailoring the message to the audience, feedback of the competitors and weighing public opinion

### II. LITERATURE SURVEY

The Key areas of analysis in Indian Political Social Media Big Data are the Sentiment Analysis, Trend Analysis, Influencer Identification, Network Analysis and Voter Behavior Analysis.

Sentiment Analysis or Opinion Mining is a Natural Language Processing technique used to determine the polarity of emotions as either positive, negative or neutral. This analysis is performed on textual data which as its applications in every realm of life such as business, education, health care and social media.

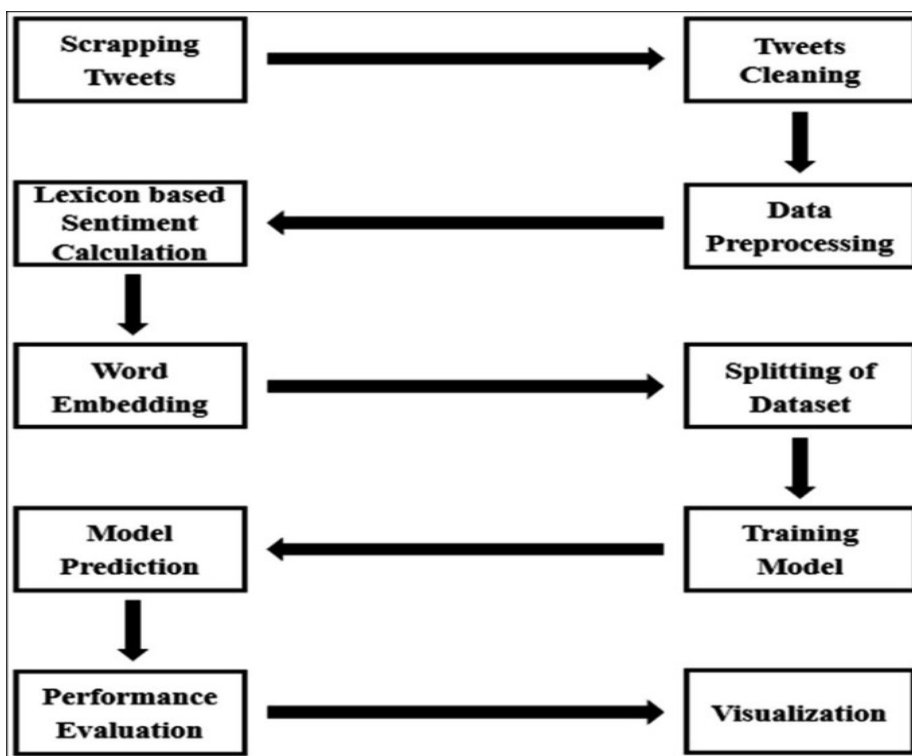


Fig 1: Sentiment Analysis of Political Tweets

Sentiment analysis is performed at three levels namely Document Level, Sentence Level and Sub-sentence Level, Methods of execution are Rule-Based approach entails Stemming, Tokenization, POS Tagging, Parsing, Lexicon Analysis. Automatic approach comprises of Linear Regression, Naive Bayes, Support Vector Machines. Deep Learning algorithms include Convolutional Neural Networks, Deep Neural Networks and Recuurent Neural Networks.

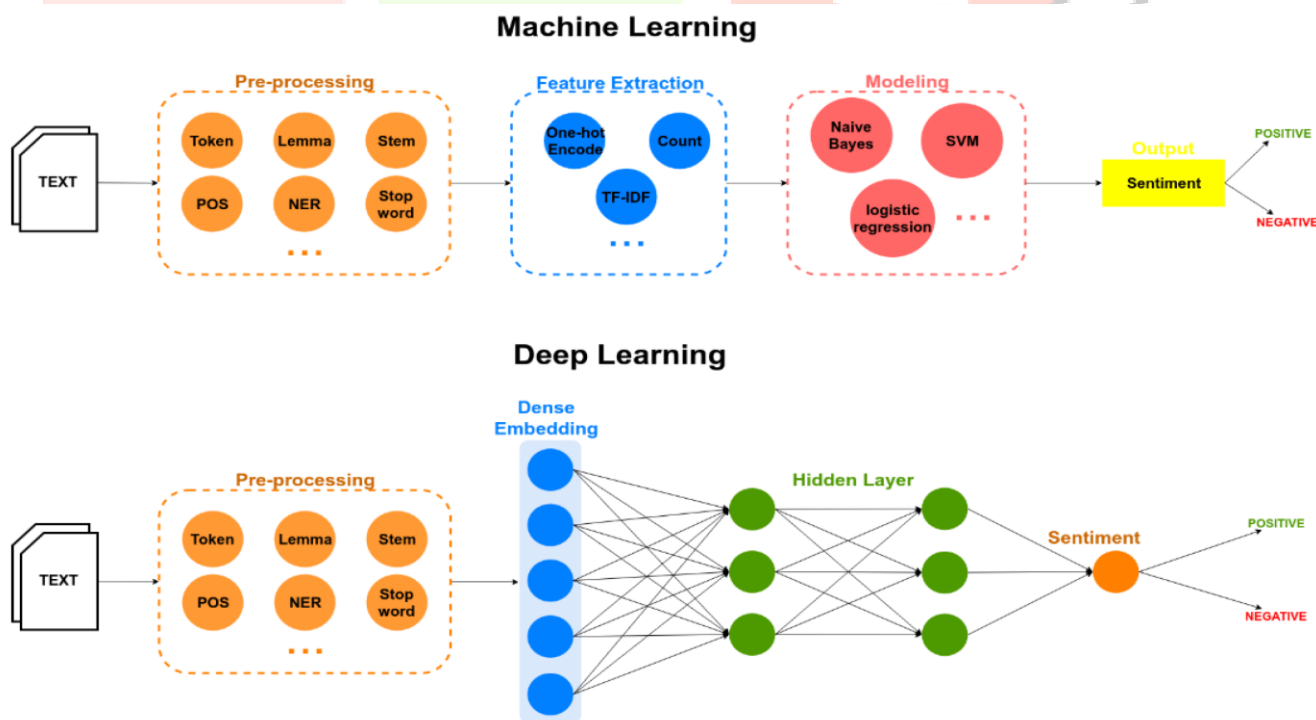


Fig 2: Sentiment Analysis with Machine Learning and Deep Learning

Voter Behavior Analysis refers to the voting attitude of the elector which is based on multiple social factors like race, religion, social and economic class.

Influencers are identified with the political data using hash tags, viral campaigns and live streaming events to galvanize support for a specific candidate.

[A.Khatua,Kuntal Ghosh,Nabendu Chaki] [1]

Proposed an approach of election result prediction that collects tweets and identifies the relevant ones to proceed with the processing. Regional dynamics,tweet volume,sentiment score and loyalty of the voters are emphasized.

[Ankita Sharma,Udayan Ghose] [2]

This work is an amalgamation of text mining and sentiment analysis that considers the tweet size and not the format. Tools like R, Rapid Miner's ALYLIEN extension were used to analyze the polarity of two candidates participating in the election. The experimental result was in full compliance with the actual result.

[John P.Dickerson,V.Kagan,V.S.Subramanian] [3]

have proposed an approach to detect the bots called SentiBot framework that classifies the users of 2014 Indian Election as humans or bots. This framework relies on the tweet syntax,tweet semantics,user behavior and network-centric user properties. Area Under ROC Curve(AUROC) method determines bots with the expected spread of sentiment.

[Q.Alvi,Syed Farooq Ali,Shiekh Bilal,Ahmed,Nadeem Ahmad Khan,Mazhar Javed,Haitham Nobanee][4]

This study states that deep learning approach produces promising results with the twitter election data. The correlation between sentiment patterns and election outcomes along with the conventional polling data, campaign strategies,etc indicate the result.

[Arpit Khare,Anusha Ganguar,Sudhakar Singh,Shiv Prakash][5]

have proposed an idea of transfer learning technique for handling sarcastic tweets of 2019 elections. The output of this technique is vote percentage difference and the prediction of election result which was exactly same as the actual result.

[Ali Hasan,Sana Moin,Ahmad Karim,Shahaboddin Shamsirband][6]

This study works on a hybrid approach that combines the sentiment analyzers with Machine Learning algorithms for learning the election sentiments. In Lexicon-based Sentiment Analysis,semantic orientation is calculated along with the implementation of Naive Bayes and Support Vector Machine on the textual data. Three Sentiment Analyzers namely SentiWordNet,TextBlob and W-WSD are compared, the latter one performed better than the other two in analyzing the political views.

[Barkha Bansal,Sangeet Srivastava][7]

This work suggests a novel method named Hybrid Topic Based Sentiment Analysis(HTBSA) that captures word relations , co-occurrences in short length tweets for election prediction and ranking of the parties.

[Bharat R.Naiknaware,Seema S.Kawathekar][8]

This work describes the prediction of 2019 election results and the popularity of Government schemes used for campaigning is verified.

[Magdalena Riedl,Carsten Schwemmer, Sandra Tiewiecki,Lisa M.Ross][9]

introduces political influencers as authentic digital opinion leaders who contribute to the education and political information of the youngsters on the positive side.

[Mudasir Mohd,Saheeba Javed][10]

proposed the first general election prediction system that describes a tool named poliweet which uses semantica as the feature whose interface is user-friendly.

[Sharmistha Chatterjee, Sushmita Gupta][11]

present a Machine Learning based generic system framework and Representation State Transfer(REST) plugin component that extracts and filters authentic tweets from twitter,captures the prevalent mood and predicts the sentiments of any live incoming tweet in a resource -constrained setup

[Piyush Charan,N.Bindu Madhavi,Pavitar Parkash Singh,Amedapu Srinivas][12]

This work suggests the supervised learning problem that emphasizes on political campaigning of the leaders through their tweets. The political sentiments are mined and analyzed to infer the election outcome

[Het Patel,Aditya Kansara,Boppuru Rudra Prathap,Kukatlapalli Pradeep Kumar][13]

This study mines the tweets of political contenders by examining them and rates a range of political tweets and comments. With this political engagement of the participant is established.

[Palashi Vaghela,Ramarvind K Mothilal, Joyojeet Pal][14]

have illustrated that caste privilege persists in India and the twitter networks have examined the significant relationship with the centrality, connectivity and engagement of a candidate in the Lok Sabha.

[Aswini Varna VV][15]

Describes the techniques of Big Data analytics that helps the campaign managers to come out with the most suitable strategies to win the votes resulting in more interactive election campaigns.

[Mid Safiullah,Pramod Pathak,Saumya Singh][16]

presents the relationship between TwitterBuzz and the news media illustrating the usage of political marketing. The latter have obtained significant results in 2014 elections.

[Surabh D Dorle,Dr.Nitin N Pise][17]

This work proposed a framework to sense the emotions of users through tweets and facebook posts. Recurrent Neural Network Model with LSTM output is evaluated to predict the polarity of voters.

[Amartya Chakraborty,Nandini Mukherjee][18]

The structure and dynamics of West Bengal State Assembly election-based tweet reply network have been studied for 6-weeks. Identification of hashtag and cluster dominance approaches are used as the forecasting tools for predicting the election outcome.

[Vedanshu Sharma,Vipul Sharma,Dhanesh Shukla,Dr.Poonam Tanwar, Dr.Brijesh Kumar][19]

presents a web-based approach using python for analyzing the incoming live sentiments at the same time.

[Ferdin Joe John Joseph][20]

This study had implemented supervised learning approach called Decision-tree classifier to predict the outcome of 2019 elections with the twitter data. The proposed methodology incurred great success from the tweet analysis in english languages

[Sarah Masud,Tanmoy Charaborty][21]

analyzes the curated twitter posts to educate the citizenry about the quality of political discourse. Within the larger purview of offensive content, political attacks are known as defamatory and accusatory remarks which are made to project the opposing political parties negatively. The twitter data is also used to quantify the power dynamics of self-promotion and negation pinned on the ruling party before and after elections.

[Gagandeep Jagdev, Amandeep Kaur][22]

assists the electorates of Punjab state to have a better decision for voting the right person who formulates good governance. Apache Hadoop framework is used for mining and extracting relations from the database, processing is performed by Map Reduce Technology. Hortonworks Sandbox-1.3- Vmware is used for deployment of the application.

[Manikandan G,Ananada Raju G,Karthikeyan B][23]

suggests a new online voting method for Indian elections to increase the number of voter's participation in the election process. This method employs Novel Candidate Verifiability mechanism to check the integrity of the vote and One Time Password mechanism that identifies the voter. Internet based voting system have several advantages like reduced cost,less overhead and great voter's turnout.

[Pradyumna Parida, Sneha Sinha, Arun Prakash Agarwal, RaghuRaj Singh Yadav][24]

predicts the election results of 2024 Indian General Election for 545 Lok Sabha Seats. Vote swings are analyzed using Machine Learning algorithms Popular trends are detected to obtain insights about the existing potential voters. The responses of the voters are determined to provide cross opportunities that improves decision-making process.



[Mohd Zeeshan Ansari, M.B.Aziz, M.O.Siddiqui, H.P.Mehra,K.P.Singh][25]

Introduces TwiSP ,a framework for analyzing polarization on controversial topics in Twitter. TwiSP utilizes two machine learning techniques: stance detection for identifying attitudes and perspectives,BERTopic for Topic Modeling. The outcome is a visual tree like representation of all tweets related to conflicting topics contrasting their relationships using different colors to denote the degree of polarization.

[Saurabh Gupta, Asmit Kumar Singh, Arun Balaji Buduru, Ponnurangam Kumaraguru][26]

performs large scale empirical analysis of 2019 elections using only the hash tags shared on twitter during the specified period. From the collected 24 million hashtags,trends of the voters are unfolded ,latent topics are used to uncover the representative hashtags and semantic similarity discovers sentiments.

[Dr.Manpreet Kaur, Dr.Rajesh Verma, Dr. Sandeep Ranjan][27]

mines the tweets of users to predict the future trends of 2019 elections. Long Short Term Memory[LSTM] along with Random Forest and other machine learning algorithms are executed for retrieving the political sentiment analysis of national political parties of India.

[Anindita Borah, Sanasam Ranbir Singh][28]

This study investigates the existence of Indian Political Polarization on Twitter Social Media Platform based on the following characteristics of Polarization namely pattern of interaction and opinion divergence ,Social network analysis and content analysis methods have been used to analyze the tweets between 2019 and 2020. With reference to pattern of interaction, Indian Politicians behave strategically depending on the layer of communication such as same party mention reflects support whereas cross-party reflects disagreement. In terms of opinion divergence,retweet networks in the former scenario does not ensure similarity in interest and opinions among the politicians wherein the same is manifested through Hash tag similarity.

[Chhandak Patra, Pushparaj Shetty.D, Sonali Chakraborty][29]

Present a combined model of Sentiment Analysis and graph techniques to discover the trending hashtag networks propagated by political parties using twitter. These hashtag generated networks assist in understanding the agenda-setting of each party along with their rate of success. This work delves deeper into the intricacies of Social media space in the General Elections.

[Priyavrat Chauhan, Nonita Sharma, Geeta Sikka][30]

Assesses the power of various volumetric, sentiment and social network approaches for predicting crucial decisions from online social media platforms. Sentiment Analysis is used to gauge the mood of public through social networks for predicting the election results.

### III. RESEARCH CHALLENGES

With the humongous data available over social networks, tweets of the politicians as well as the common public leave conundrum in analyzing the input stream of data. Machine Learning, Deep Learning and Sentiment Analysis algorithms have been applied on labeled data only and language barrier is the significant bottleneck in the analysis and processing of opinions. Engagement of the middle-aged and Senior citizens is considerably scarce in voicing their thoughts upon the General Elections.

### IV. CONCLUSIONS AND FUTURE DIRECTIONS

According to the study, following observations have been made:

- Machine Learning and Deep Learning algorithms have been executed on the diverse colossal data to understand the voters
- Sentiment Analysis algorithms have been applied to obtain the polarity of voter's opinions.
- Social networking sites such as Facebook,Instagram and twitter are examined, of which Instagram and twitter are containing loads of data to be analyzed.
- Various frameworks and tools have been deployed on the social media Election data.
- Hadoop ecosystem is scarcely used to analyze the Indian Election Twitter Data until now,if used significantly will draw meaningful comprehension.
- Big Data that is derived from the tweets of all states of India perhaps predicts the election results at an accelerated pace.
- Spark with Artificial Intelligence may generate the result prediction of election campaigns, strategists remarks, surveys and the leader forming the Government

## V. REFERENCES

- [1] A.Khatua,Kuntal Ghosh,Nabendu Chaki, “Can #Twitter\_Trends Predict Election Results? Evidence from 2014 Indian General Election”, in Proc. IEEE HICSS, 2015, pp. 1530-1605
- [2] Ankita Sharma,Udayan Ghose, “Sentiment Analysis of Twitter Data with respect to General Elections in India”, in Procedia Computer Science .ICITETM, 2020, pp.325-334
- [3] John P.Dickerson,V.Kagan,V.S.Subramanian ,” Using Sentiment to Detect Bots on Twitter: Are Humans more Opinionated than Bots?”, in Proc. IEEE ASONAM , 2014, pp. 4799-5877
- [4] Q.Alvi,Syed Farooq Ali,Shiekh Bilal,Ahmed,Nadeem Ahmad Khan,Mazhar Javed,Haitham Nobanee] ,” On the frontiers of Twitter data and sentiment analysis in election prediction: a review”, in PeerJ Computer Science, 2023, DOI:10.7717/peerj-cs.1517
- [5] Arpit Khare,Anusha Ganguar,Sudhakar Singh,Shiv Prakash, “Sentiment Analysis and Sarcasm Detection of Indian General Election Tweets”, in Proc. ANTIC , 2021, CCIS,Springer.
- [6] Ali Hasan,Sana Moin,Ahmad Karim,Shahaboddin Shamshirband, “ Machine Learning-Based Sentiment Analysis For Twitter Accounts”, in MDPI, 2018, [Online]. Available at [www.mdpi.com/journal/mca](http://www.mdpi.com/journal/mca)
- [7] Barkha Bansal,Sangeet Srivastava, “On predicting elections with hybrid topic based sentiment analysis of tweets”, in Procedia Computer Science ICCSCT, 2018, pp. 346-353
- [8] Bharat R.Naiknaware,Seema S.Kawathekar ,”Prediction of 2019 Indian Election ,Using Sentiment Analysis”, in Proc. IEEE I-SMAC, 2018, ISBN:978-1-5386-1442-6
- [9] Magdalena Riedl,Carsten Schwemmer, Sandra Tiewiecki,Lisa M.Ross, “The Rise of Political Influencers- Perspectives on a Trend Towards Meaningful Content”, in Proc. Frontiers in Communication, December 2021, Volume 6, Article 752656
- [10] Mudasir Mohd,Saheeba Javed,Mohsin Altaf Wani, Hilal Ahmad Khanday, Abid Hussain Wani,Umar Bashir Mir,Sheikh Nasrullah, “poliWeet-Election prediction tool using tweets”, in Elsevier, 2023, pp.2665-9638
- [11] Sharmistha Chatterjee, Sushmita Gupta, “Incremental Real-time Learning Framework for Sentiment Classification: Indian General Election 2019,A Case Study”, in Proc. IEEE ICBDA,2015, pp. 978-0-7381-3167-2
- [12] Piyush Charan,N.Bindu Madhavi,Pavitar Parkash Singh,Amedapu Srinivas, “Data analytics to reflect the current politics on twitter by using Machine Learning”, in Proc. IEEE ICCI, 2023, pp. 979-8-3503-4821-7
- [13] Het Patel,Aditya Kansara,Boppuru Rudra Prathap,Kukatlapalli Pradeep Kumar,”Human behavior analysis on political retweets using machine learning algorithms”, in Elsevier, 2023, [Online]. Available at <https://doi.org/10.1016/j.measen.2023.100768>
- [14] Palashi Vaghela, Ramarvind K Mothilal, Joyojeet Pal,”Birds of a Caste -How Caste Hierarchies Manifest in Retweet Behavior of Indian Politicians”, in Proc. ACM HCI,2021, pp. 1-24
- [15] Aswini Varna VV, “ Big Data Analytics and Transformation of Election Campaign in India”, in Proc. ISMS,2019, <https://ssrn.com/abstract=3511428>
- [16] Mid Safiullah, Pramod Pathak,Saumya Singh, “The impact of social media and news media on political marketing: an empirical study of 2014 Indian General Election”,
- [17] Surabh D Dorle, Dr.Nitin N.Pise, “ Political Sentiment Assessment through Social Media”, in Proc. IEEE ICCMC, 2018, [Online]. Available at DOI:10.1109/ICCMC.2018.8487879
- [18] Amartya Chakraborty,Nandini Mukherjee, “Analysis and mining of an election-based network using large-scale twitter data : a retrospective study”, in Springer- Verlag SNAM, 2023, [Online] . Available at <https://doi.org/10.1007/s13278-023-01081-0>
- [19] Vedanshu Sharma, Vipul Sharma,Dhanesh Shukla,Dr.Poonam Tanwar, Dr.Brijesh Kumar, “Live Twitter Sentiment Analysis”, 2020, [Online]. Available at <https://ssrn.com/abstract=3609792>.
- [20] Ferdin Joe John Joseph, “Twitter Based Outcome Predictions of 2019 Indian General Elections Using Decision Tree”, in Proc. IEEE InCIT,2019, pp. 978-1-7281-1019-6
- [21] Sarah Masud,Tanmoy Charabarty, “Political mud slandering and power dynamics during Indian assembly elections”, in Springer-Verlag SNAM, 2023, [Online]. Available at <https://doi.org/10.1007/s13278-023-01103-x>
- [22] Gagandeep Jagdev, Amandeep Kaur, “Analyzing and Scripting Indian Election strategies using Big Data via Apache Hadoop Framework”, in IEEE, 2016, pp. 978-1-5090-0893-3
- [23] Manikandan G,Ananada Raju G,Karthikeyan B,”A Candidate Aware Internet Voting System For Indian Scenario”, in Proc. IEEE ICACCS, 2020, ISBN:978-1-7281-5197-7
- [24] Pradyumna Parida, Sneha Sinha, Arun Prakash Agarwal, RaghuRaj Singh Yadav, “Predicting The General Election 2024 Using ML And Data Analytics”, in Proc. IEEE INCET,2023, ISBN: 979-8-3503-3575-0

- [25] Mohd Zeeshan Ansari, M.B.Aziz, M.O.Siddiqui, H.P.Mehra,K.P.Singh, “ Analysis of Political Sentiment Orientations on Twitter”, in Procedia Computer Science ICCIDS,2019, pp. 1821-1828
- [26] Saurabh Gupta, Asmit Kumar Singh, Arun Balaji Buduru, Ponnurangam Kumaraguru, “Hashtags are (not) Judgemental : The Untold Story of Lok Sabha Elections 2019”, in IEEE BigMM, 2020, pp. 978-1-7281-9325-0
- [27] Dr.Manpreet Kaur, Dr.Rajesh Verma, Dr. Sandeep Ranjan, “Location-based Sentiment Analysis of Indian Political Campaign on Twitter”, in INT-JECSE, 2022, Vol 14, ISSN:1308-5581
- [28] Anindita Borah, Sanasam Ranbir Singh, “Investigating political polarization in India through the lens of Twitter”, in Proc. Springer –Verlag SNAM,2022, [Online]. Available at <https://doi.org/10.1007/s13278-022-00939-z>
- [29] Chhandak Patra, Pushparaj Shetty.D, Sonali Chakraborty, “Analyzing Information Flow of Hashtag Networks during Elections using Sentiment Analysis and Graph Algorithms”, in Proc. IEEE CONECCT, 2022, pp. 978-1-6654-9781-7
- [30] Priyavrat Chauhan, Nonita Sharma, Geeta Sikka, “The emergence of social media data and sentiment analysis in election prediction”, in Proc. Springer- Verlag JAIHC, 2020, pp.2601-2627

