



RESEARCH PAPER

Social Media Analytical Tools: A Review of its Application, Challenges and Future Trends

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ABSTRACT

Social media contains a lot of user uploaded data in different formats like text, images, photos, video etc. These large volumes of data are converted in meaningful information which can be understood using different methods and tools which are called social media analytics. This paper presents the report of a social media analytics (SMA). The review conducted to find out the methods, tools Application, Challenges and Future Trends used in social media analytics, types of social media platforms which the SMA are performed and the field which SMA has been performed. Literature suggested that the social media platforms which were mostly used are twitter, Facebook, YouTube, trip advisor and blogs. Moreover, SMA has been observed in different fields like agriculture, politics, health, social and business sector. It has been observed that numerous challenges are faced by businesses in adopting social media analytical tools to support the knowledge-based business strategies. Correspondingly, the present-day corporate challenges from the perspective of social media analytics in its adoption for corporate decisions have been outlined. The paper also offers recommendations such as conducting cross-platform analysis, incorporation of AI, immediate analytics and predictive analytics in SMA for better decision making.

KEYWORDS Social Media Analytics, Facebook, Twitter, Youtube, Social Media Tools

Introduction

Social media are web-based services which allow users to post through their profiles and also to stay connected with other users. Social media platforms like Facebook, Instagram, Twitter and YouTube have become increasingly popular in recent years (Muzaffar, et. al., 2019; Madila et al., 2021). Due to increase in popularity of social media sites among the users, marketers and businesses are also working to make their online presence better. As it is an opportunity for the businesses to connect better with their audience, it also proves to be a challenge at times because customers are actively sharing their reviews about different products with each other online. So, the businesses have to make sure that customers say positive things about their products and services on social networking sites (SNS). All the brands are concerned nowadays, is what people are saying about their product and how can they make their products better to cater the needs of customers etc. (Nanda & Kumar, 2021).

Social media has become a common communication tool in politics, businesses, tourism, journalism, agriculture and other fields. As number of users on social media platforms are increasing, a big amount of structured and unstructured data has been created by these users which can be used in different ways depending upon the nature of data retrieval. Specifically, analysis of social media data can provide better understanding of a particular social phenomenon, this data can also help businesses to understand the customers' psychology and to help them gain competitive advantage or to help influence public opinion or political results online. Organizations and businesses need automated

tools to retrieve and analyse social media data to gain relevant perspectives and insights (Muzaffar, et. al., 2020; Zachlod et al., 2022).

In the early days, PR agencies used to analyse customer behaviours on company's websites but with the explosion in social networking sites and its use became nearly impossible to study customers' behaviours about different brands since the audience engage more on social networking sites than on brands' websites which led to the need of social media analytics (Fan & Gordon, 2014). Social Media Analytics (SMA) is an interdisciplinary research area that deals with gathering, curating and incorporating informatics tools, methods and frameworks to collect, track, analyse and interpret large number of social media data that is available in structured, semi structured or unstructured forms in order to extract useful insights and pattern according to the purpose of data retrieval (Stieglitz et al., 2014). The purpose could vary from understanding human behaviour of online communities, influencing behaviours or making predictions based on the patterns that emerged through social media analytics. Social media analytics is basically an interdisciplinary approach which relies on retrieving primary or already available data instead of developing data proactively.

Social media analytics is both a science and an art. On the scientific front, it entails the systematic identification, extraction, and analysis of social media data, encompassing elements like tweets, shares, likes, nodes, and hyperlinks, employing advanced tools and techniques. Simultaneously, it is an art form involving the interpretation and alignment of the acquired insights with business goals and objectives (Khan & Dillon, 2019). Lovett and Owyang (2010) define social media analytics as a discipline that allows businesses to access and interpret the success of their social media campaigns against the business goals they set to achieve. SMA are mostly interpretations and analysis of quantifiable data that can tell businesses information about conversations and activities that are being carried out online. In short, social media analytics is about human behaviours online. Most of the organizations and businesses these days rely on social media analytics to analyse their strategic decisions, objectives, their performances and to compare their progress with competitors at a more practical level.

Fan and Gordon (2014) categorized social media analytics into three stages to make sense of data retrieved from social media for various purposes. The first step is data capturing: the first and most basic step involves obtaining social media data by tracking data from different social media platforms like Facebook, YouTube, Twitter, LinkedIn, Google+, Pinterest etc. including smaller level personal channels like blogs, micro blogs etc. A large amount of data is retrieved depending upon the purpose that different businesses want to achieve. The data is retrieved in raw form and it can either be in structured, semi structured or unstructured form. The relevance of data retrieved unfolds in later stages of social media analytics where irrelevant, unfiltered and vague data is excluded for further analysis. This step can be done by company itself or organizations can hire some people for this purpose as well.

The second step in social media analytics is data understanding: this step is the interpretation step in which the purpose is to make sense of the retrieved data. This is the step where the irrelevant and unwanted data is eliminated. Different advanced level analytical techniques and statistical methods are used for extracting useful information and insights from the retrieved data. Human involvement become necessary in this stage as data interpretation cannot be done by machines. This stage produces useful metrics about users related to their experiences online which can prove to be useful for organizations during their decision-making process.

The last and final stage is data presentation: This step involves the presentation of the data that has been interpreted and analysed in the 2nd stage. The data has to be presented in a much simpler, understandable and attractive form. For this purpose, many

visualization techniques can be used. This stage is important in a way that this is the main product presented in front of organizations and businesses, so the final results have to be presented in an interesting manner and should have high predictive value. It might arise a need to go back to the previous stages of data capturing and data understanding to adjust the data presentation. At this stage help might be taken from visual data analysts' and statisticians for better presentation of the final results.

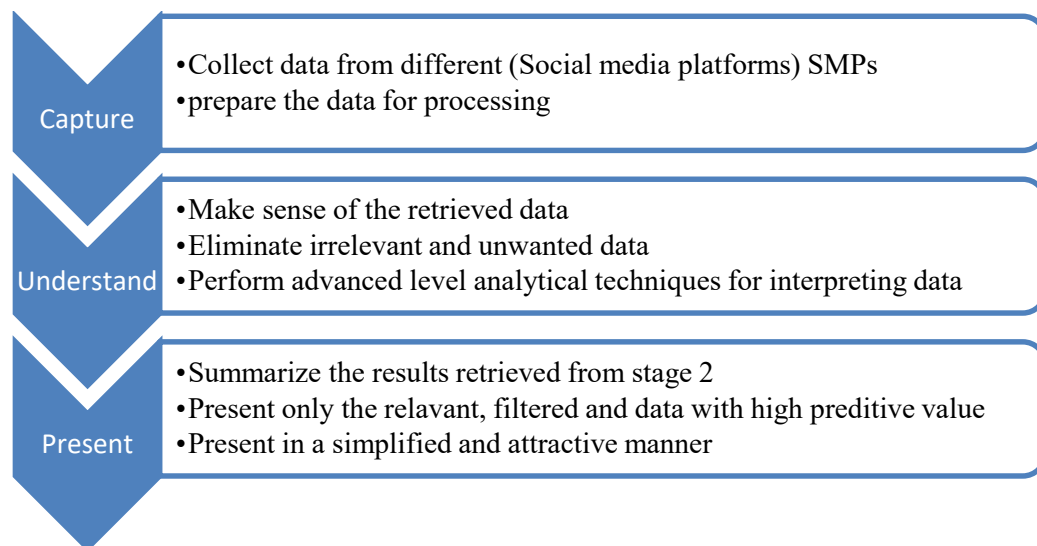


Figure 1 Process of Social Media Analytics by Fan and Gordon (2014)

Literature Review

In order to unravel the multidimensional landscape of SMA i.e. Social Media Analytics, this literature review conducts a thorough examination of the essential elements of SMA. The literature review offers a comprehensive understanding regarding several facets that comprise SMA, such as the techniques, methods and tools utilized in SMA, data tracking approaches, data analysis methods and processes, platforms of SMA including YouTube, TripAdvisor, Facebook, Flickr, Instagram and Twitter. Moreover, the literature review also explicates how SMA is applied and utilized across numerous domains and fields, as well as it examines how numerous organizations and academicians use the SMA data for audience engagement, trend forecasting and deliberate decision-making in the digital milieu.

The current paper is an attempt to discuss and review the existing literature which serves as basis for conducting research on the application of SMA in various areas like fashion, sports, and business through existing literature. Moreover, this research will offer different types of research studies aligned with different platforms and data tracking approaches used for the integration of SMA. It will also provide guidelines on challenges faced by the users through the integration of SMA techniques/tools, also to access the ethical concerns raised through the incorporation of SMA in different domains, lastly, the paper discusses the future directions regarding the application of SMA through the lens of customer engagement, consumer behavior and consumption patterns.

Platforms for SMA

Platforms of SMA are indispensable for acquiring valuable insights from larger data collected from multiple and varied networks of social media. Numerous platforms of social media are being utilized for SMA including YouTube, Facebook, Twitter, Instagram, TripAdvisor and many other. Facebook, a prominent social media site, offers a powerful analytics package that allows businesses and brands to gauge audience engagement

patterns, manage page performance, and comprehend demographic data of audience (Tuten & Solomon, 2017). Likewise, Twitter analytics delivers real-time report on engagement indicators, tweet performance and demographics of followers, enabling users to redefine and hone their content approaches. Furthermore, YouTube analytics emphasize on metrics of video performance including watch time, views, unique viewers, and subscriber statistics, which aids the content creators to optimise and augment their video content (Manko, 2023). Instagram, a visual-oriented social media site, offers tools for analytics that provide information on post engagement, user demographics, and the performance as well as efficiency of Instagram stories. Apart from this, TripAdvisor analytics is also valuable for organisations in the travel and hospitality industries, since it provides data on consumer preferences, ratings and reviews. Besides these platforms, *TikTok*, *WeChat* and *Weibo* are also the emerging platforms that are now being used for SMA (Micera & Crispino, 2017). Each of these platforms of SMA serves a distinct function, assisting and empowering the users in customising their plans, measuring and tracking success, and refining their online presence across a variety of social media networks.

Data Analysis Methods and Approaches in SMA

A comprehensive range of approaches and strategies are utilized in the dynamic landscape of SMA to extricate vital insights from constantly evolving and vast data of social media. In the multifaced milieu of social media, approaches such as sentiment analysis and NLP (Natural Processing Language) are essential for the researchers and organizations to comprehend the user's sentiments, feelings and content dynamics (Manning, Raghavan, & Schütze, 2008). *Sentiment analysis* is among one of the most frequently utilized SMA approaches that gauges and categorizes the user sentiments articulated on multiple platforms of social media as positive, neutral and negative (Liu, 2012). Apart from this, *textual analysis*, that is also termed as "opinion mining" encompasses the structured and systematic analysis of textual information for themes, pattern, trends and insights identification, which ultimately allows for a deeper understanding of users' opinions, likings and preferences. Furthermore, *NLP (Natural Language Processing)* concentrates on studying computers interaction with human language. Such approaches are employed in SMA for reading and processing of natural text language, that consequently enables unconventional and nuanced analysis of data on social media sites (Manning, Raghavan, & Schütze, 2008). Additionally, social network analysis, clustering and predictive analysis are tools that assist in detecting and recognizing future trends, and patterns, as well as it aids in unravelling the intricate associations within the online communities (Agrawal, Goyal, & Lakshmanan, 2013; Wasserman & Faust, 1994). *Clustering* is a technique that groups the items of data together on the basis of comparable attributes. It is used in SMA to reveal the trends and compile the social media data which is comparable, thus facilitating the discovery of user preferences and patterns. *Social network analysis (SNA)* scrutinizes the associations, linkages and interactions of users within the social networks. This strategy aids in understanding the online communities' patterns and structures as well as identifying the significant influencers (Wasserman & Faust, 1994). *Predictive analysis* uses previous data to forecast future patterns, trends or consequences. Predictive analysis is employed in SMA to foresee user trends, patterns, behaviours and content's virality potential.

Besides, some other approached and methods employed in SMA include topic modelling, spatial analysis, trend analysis, event detection tools, comparative analysis, Facebook Insights and Twitter API. *Topic modelling* is basically a statistical approach for identifying subjects/topics in a group of texts. This strategy is used in SMA to identify predominant themes and topics in social media deliberations (Blei, Ng, and Jordan, 2003). *Spatial analysis* examines data based on geography. Spatial analysis can help SMA researchers comprehend and recognize the geographic circulation of user communications and connections as well as social media discussions deliberations. *Trend analysis* identifies and analyses trends and variations in the content and user behaviour across certain time.

This strategy enables the organizations and scholars to keep themselves updates on evolving interests and themes (Agrawal, Goyal, & Lakshmanan, 2013). *Event detection tool* identifies and tracks noteworthy events or occurrences within the data of social media. Such even detection tools provide real-time and immediate monitoring of social media debates, conversations and events, allowing for instant fast responses. *Comparative analysis* compares data sets to detect the patterns, similarities, trends and differences. In SMA, this strategy aids to comprehend how distinct entities or themes compare to one another. *Twitter APIs* (Application Programming Interfaces) offer developers the access to Twitter's statistics and data. This programme enables the extraction and examination of immediate Twitter data, providing significant insights into user interactions, patterns and trends. Lastly, *Facebook Insights* is a built-in tool from Facebook used for analytics. It provides precise analytics on users' interaction, audience demographics and page performance, which assist the brands and businesses to better recognize their Facebook existence.

As SMA continues to play an important role in developing digital strategy, the combination of all these different approaches and methods is the foundation for obtaining meaningful insights and navigating the intricacy of social media statistics.

Data Tracking Approaches in SMA

Data tracking approaches and techniques in SMA include a variety of methodologies for collecting and monitoring data across social media platforms. These diverse monitoring approaches and methodologies provide analysts and research scholars with a variety of tools for navigating the intricacies of social media information/data and extracting relevant information. Data tracking approaches/techniques for brands, organizations and institutions vary based on their unique goals and intentions. Five major data tracking techniques utilized for distinct purposes include *Self-involved technique*, *Actor-based*, *Keyword-based*, *URL-based* and *explorative or random technique*. Firstly, the *self-involved tracking* approach in SMA monitors individual user's interactions and activities such as user's engagements, posting activities and timings, interactions, and connections in particular social media contexts with intention to learn about their likings, preferences and behaviours (Kaplan & Haenlein, 2010). This strategy is fruitful for assessing individual user practices, experiences and customising strategies of content according to individual preferences. Secondly, *Actor-based tracking* approach monitors particular users or entities on social media. This method can help the analysts to analyse the engagement patterns and influence, relationships/interactions of significant organisations, brands or individuals (Gruzd, Wellman, & Tekhteyev, 2011). Researchers may acquire the ways in which particular actors shape the trends and discourse of online groups or communities. The *Keyword-based tracking* is the third approach utilized in SMA that monitors the relevant discussions and information/evidence on varied social media platforms by utilizing specific keywords or hashtags (Zhang et al., 2023). Analysts or experts may record and assess the patterns, deliberations, trends, sentiments and conversations by concentrating on topic or trend specific keywords and hashtags, thereby providing a targeted, well-constructed and efficient method for gathering the pertinent data. Fourthly, the approach of *Random or Explorative tracking* in SMA enables the researchers to scrutinize the social media information/data without any predetermined parameters. This technique allows for recognition and detection of developing trends, patterns, drifts or outliers that couldn't be observed with other tracking methodologies (Zhang et al., 2011). In short, this technique examines the landscape of social media in a flexible manner. The last approach is *URL-based tracking* that explores the published content or content shared on varied platforms of social media via URLs. In order to deeply comprehend the proliferation of external material and its impact on social media interactions (Asur & Huberman, 2010).

Applications of SMA

To generate understanding from social media, SMA has been used in different areas that will eventually lead to decision making. The dominating part of SMA is that it is used in variety of fields like health tourism, political journalism, sports and fashion industry. The fusion of SMA and political journalism has a transformational effect on political discourse, public opinion, and electoral procedures. Many researchers conducted the study on the usage of SMA particularly during elections and in this regard (Mazumdar & Thakker, 2020) studied the pioneering effect of twitter usage on forecasting elections in the field of political communication. Their study indicated SMAs potential to provide real time interpretation of voter engagement, political trends and public opinion, stressing on its capacity as a tool for commentators, analysts, campaign planners and political actors.

SMA is also integrated in the field of business to develop business plans which appeared as a game changer, giving unparalleled insights regarding brand perception, market trends and customer behaviour. Fundamental research was conducted by (Kaplan & Haenlein, 2010) on challenges and possibilities that social media addresses to organizations. The study highlighted potential of SMA regarding user created content (UCC), that allow companies to recognize and comprehend customer emotions, attitudes and suitable customization of their products and services.

Another revolutionary influence of SMA is its integration in the fashion industry, providing insights on brands accesses customer behaviour and market trends. Huang and Lin (2019) explore the integration of SMA in fashion industry, depicting its significance in the context of customer behaviour and brand impression. The study investigated the role of SMA technologies in assisting fashion companies to evaluate huge amount of social media analytics, unfolding customer choices and changing patterns in real time.

With the influx of SMA the media sector has been through diverse transformation. Newman's (2011) study developed an understanding of the relationship between social and mainstream media. His study explores that how new areas of social media influences news dissemination by focusing on the effects of social networks on news transmission. It is critical for SMA technology to identify content vibrancy, calculating audience engagement, and accessing knowledge sharing patterns in the era of social media networking.

Sports is also another significant sector of SMA application which helps in gauging sports engagement, earning revenues and fan sponsorship ROI. Research shows that how SMA technology helps sports companies in evaluating fan choices, marketing strategies, and enhancing revenues through specific promotions (Chadwick, 2017). Besides fashion and sports, SMA technologies is significantly integrated in tourism and health care. Nagowah & Joaheer (2018) investigated social media analytics in the domain of healthcare in order to identify those who are at risk of undergoing diabetes mellitus. They proposed a model that will help those who are patients and also at-risk individuals. Chang et al. (2017) demonstrated the implementation and applicability of SMA in the tourism and hospitality sector. They employed sentiment analysis by providing a context related to hotel evaluations from trip planner. Another study of Navarro & Rodriguez (2019) portrayed the use of SMA in the tourism industry. For their study, data was collected from Facebook and Instagram, providing an understanding on cheap accommodations in tourist locations. The study clearly indicated social media data can help tourist in finding affordable and low-cost accommodation.

Challenges in SMA

Although SMA techniques and tools are considered affective for analysing new trends, integration patterns, also for highlighting companies content creation techniques

and brand itself. But integration SMA techniques/tools also poses some diverse challenges and obstacles for organizations, analysts, and researchers. The most significant hurdle is the ongoing growth of digital networks and the usage complexity, that eventually move towards other challenges like diversity, velocity and volume (Chen et al., 2012). Another substantial barrier relates to privacy concerns, as moral and ethical consumption of audience centric content becomes significant while SMA tools

According to (Gandomi & Haider, 2015) social media platforms have informal and casual networking which ultimately pose an obstacle in interpreting and detecting the textual nature of content for example usage to jargon slangs sarcasm, and irony. Another obstacle is changing nature of digital platforms in terms of new and innovative features, as it requires SMA tools to adapt and get familiar with new formats and functions (Agrawal, Goyal, & Lakshmanan, 2013). To conclude, there are issues related to the spread of fake accounts and false information, ultimately it affects the credibility of content generated from SMA tools (Zhang et al., 2018). Due to the ever-changing social media landscape, one should focus on reshaping and defining the SMA technologies for extracting useful information.

Conclusion

The vast realm of SMA (Social Media Analytics) is distinguished by intricate tapestry of tools, approaches and methodologies, each playing a contributing role in comprehending the ever-changing and evolving digital landscape. SMA offers an entire toolkit for extracting insights from the data of social media, including approaches of data tracking encompassing URL-based analysis, explorative analysis and self-involved monitoring, as well as data analysis strategies such as sentiment, textual and network analysis. Platforms including Twitter, Instagram, TripAdvisor, YouTube and Facebook serve as the major testing grounds for these analytics, enabling applications in fields as broad as marketing, politics, business, online media, sports and healthcare. However, challenges such as data reliability concerns and lack of technical expertise highlight the urgency of constant upgradation. Moreover, integrating SMA with future technologies such as AI, real-time and predictive analytics, promises to restructure how organisations extract useful data from the dynamic social media interactions. As SMA is playing a pivotal and enduring role in developing digital approaches, overcoming these problems is critical to realising its full potential and navigating the developing social media landscape with vision and precision.

Recommendations

The creation and integration of new technologies has to potential to revive the future of SMA. One of the most significant developments is the increased connection of SMA with artificial intelligence (AI). With the advancement in AI, and its fusion with SMA is committed to progress the digitization competences, allows for more practical insights regarding user behaviour, user engagement and sentiment analysis. Another significant factor is predictive analytics which influences the path of SMA. In SMA such type of analytics goes beyond retroactive research by utilizing the past data to portray future trends, allowing organizations and marketers to change their strategies more proactively. This futuristic approach not only guides the decision makers but it will also enhance campaign strategies, allowing audiences to respond in real time with reference to the changing preferences of consumers (Saranya & Subhashini 2023).

Meanwhile, cross platform analysis is very significantly vital in SMA as consumers very quickly move from one site to another while using social media platforms. SMA emphasized on cross platform analysis as it recognises the flexibility, providing a comprehensive understanding of consumer behaviour, their preferences, and predilections while using different social media platforms. Such tendency underlines the

increased complexity of social media platforms, demanding for a inclusive approach to understanding social media that goes beyond the diverse individual venues (Pearce et al., 2020).

An emergent critical drift in SMA is the real time analytics, demanding for comprehensive insights in modern fast paced digital platforms. Business companies get a competitive edge as SMA monitors and examine activities of digital platforms very rapidly, which allow users to respond instantly to trends, opportunities, crises and patterns as they emerge. This real time analytics also known as immediate analytics not only allows for faster decision making, but it also provides more diverse, growing and accessible engagement with different online groups.

Lastly, future developments in SMA, such as incorporation of AI, cross platform research, immediate analytics and predictive analytics is committed to change the way companies capitalize information/data on different social media platforms for better decision making. Such developments underscore the prerequisite for a more responsive, complicated and multilayered and all-inclusive approach to accomplish the growing pace of users' online interactions

References

- Agrawal, R., Goyal, A., & Lakshmanan, L. V. S. (2013). Mining trends over time in large dynamic graphs. *Proceedings of the VLDB Endowment*, 6(2), 97-108.
- Asur, S., & Huberman, B. A. (2010). Predicting the Future with Social Media. In *Proceedings of the 2010 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology*.
- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent Dirichlet Allocation. *Journal of Machine Learning Research*, 3(1), 993-1022.
- Chadwick, S. (2017). The marketing of sport. *International Journal of Sports Marketing &*
- Chang, Y.-C., Ku, C.-H. and Chen, C.-H. (2017). Social media analytics: Extracting and visualizing Hilton hotel ratings and reviews from TripAdvisor. *International Journal of Information Management*, 48, 263-279.
- Chen, M., Mao, S., & Liu, Y. (2012). Big Data: A Survey. *Mobile Networks and Applications*, 19(2), 171-209.
- Domínguez-Navarro, S., & González-Rodríguez, M. R. (2019). Social Media managerial implications for budget accommodation venues: use of Social Media platforms more effectively and efficiently. *Quality & Quantity*, 54(5-6), 1671-1689.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137-144.
- Gruzd, A., Wellman, B., & Takhteyev, Y. (2011). Imagining Twitter as an Imagined Community. In *Proceedings of the 44th Hawaii International Conference on System Sciences*.
- Huang, Y., & Lin, C. (2019). Social Media Analytics: A Survey. *Information Processing & Management*, 56(2), 292-298.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59-68
- Liu, B. (2012). Sentiment analysis and opinion mining. *Synthesis Lectures on Human Language Technologies*, 5(1), 1-167.
- Lovett, J. and Owyang, J. (2010) 'Social marketing analytics', A Framework for Measuring Results in Social Media, *Altimeter Group*.
- Madila, S. S., Dida, M. A., & Kaijage, S. (2021). A review of usage and applications of social media analytics
- Manko, B. A. (2023). Video advertising: Using YouTube analytics for the target audience. *Journal of Information Technology Teaching Cases*, 13(1), 77-81.
- Manning, C. D., Raghavan, P., & Schütze, H. (2008). *Introduction to Information Retrieval*. Cambridge University Press.
- Mazumdar, S., & Thakker, D. (2020). Citizen science on twitter: Using data analytics to understand conversations and networks. *Future Internet*, 12(12), 210.

- Micera R., & Crispino R. (2017). Destination web reputation as "smart tool" for image building: The case analysis of Naples city-destination. *International Journal of Tourism Cities*, 3(4), 406–423.
- Muzaffar, M., Chohdhry, S., & Afzal, N. (2019). Social Media and Political Awareness in Pakistan: A Case Study of Youth, *Pakistan Social Sciences Review*, 3 (II), 1-13
- Muzaffar, M., Yaseen, Z. & Safdar, S. (2020). Role of Social Media in Political Campaigns in Pakistan: A Case of Study of 2018 Elections, *Journal of Political Studies*, 27 (2), 141-151
- Nagowah, S. D., & Joaheer, R. (2018). A model for classifying people at risk of diabetes mellitus using social media analytics. In *International conference on emerging trends in electrical, electronic and communications engineering* (pp. 195–204). Springer, Cham.
- Nanda, P., & Kumar, V. (2021). Social media analytics: tools, techniques and present day practices. *International Journal of Services Operations & Informatics*, 11(4), 422-436.
- Newman, N. (2011). Mainstream Media and the Distribution of News in the Age of Social Discovery. *Digital Journalism*, 1(1), 6-28.
- Pearce, W., Özkula, S. M., Greene, A. K., Teeling, L., Bansard, J. S., Omena, J. J., & Rabello, E. T. (2020). Visual cross-platform analysis: Digital methods to research social media images. *Information, Communication & Society*, 23(2), 161-180.
- Saranya, A., & Subhashini, R. (2023). A systematic review of Explainable Artificial Intelligence models and applications: Recent developments and future trends. *Decision analytics journal. Sponsorship*, 18(3), 274-277.
- Stieglitz, S., Dang-Xuan, L., Bruns, A., & Neuberger, C. (2014). Social media analytics: An interdisciplinary approach and its implications for information systems. *Business & Information Systems Engineering*, 6(2), 89–96.
- Tuten, T. L., & Solomon, M. R. (2017). "Social Media Marketing." Sage Publications.
- Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications*. Cambridge University Press.
- Zachlod, C., Samuel, O., Ochsner, A., & Werthmüller, S. (2022). Analytics of social media data–State of characteristics and application. *Journal of Business Research*, 144, 1064-1076.
- Zhang, L., Wang, X., Liu, Y., & Liu, J. (2018). Fake News on Social Media: A Data Mining Perspective. *ACM SIGKDD Explorations Newsletter*, 20(1), 22-36.
- Zhang, W., Johnson, T. J., Seltzer, T., & Bichard, S. L. (2011). The Revolution Will Be Networked: The Influence of Social Networking Sites on Political Attitudes and Behavior. *Social Science Computer Review*, 29(1), 75-92.
- Zhang, Y., Chen, F., Suk, J., & Yue, Z. (2023). WordPPR: A Researcher-Driven Computational Keyword Selection Method for Text Data Retrieval from Digital Media. *Communication Methods and Measures*, 1-17.