Social Media Analytics: The Next Big Thing?

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ABSTRACT

The emergence of Internet and Social media has created huge opportunities for marketers to know their customers. User generated content and consumer generated media have brought social networking to a new altitude. People are eager to share what they think, what they prefer and companies are taking its advantage to the maximum. It is not only the one side of the coin which is being benefitted, consumers are also gaining in the form of improved information and opinion from users. For various companies, social media platforms have become primary source of personal information of users. Social media analytics help marketers to identify segments and know customer's appeal towards a particular brand. The present study focuses on the emergence of social media analytics and modelling. It has been observed that despite enormous benefits, companies in developing countries like India are unable to exploit the opportunity to the fullest. The present study is based on exploratory research design where extant review of literature has been carried out. It also focuses on the various methods used by marketers to derive decisions out of data available on the social media platforms. The study also includes a systematic arrangement of reviews and comments collected from a social media platform and a sentiment analysis is being conducted on the data collected. Finally this paper contributes to the area of SMA and induces marketers towards a wise use of social media analytics in their business.

Keywords: **Social Media Analytics, Social Networking. Preference, Opinion, Decision Making**

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1. INTRODUCTION

Until the last decade, the major challenge faced by the marketers was to spend a lot more on infrastructure to reach its audience. They had to have their own website and their own people. This blockage has been removed majorly by the advent of social media. The explosion of Social media can be attributed to Internet accessibility. Social media has been defined as the mobile-based Internet application that allows its users to generate and share the content on a common platform. The rapid growth of social media in the past few years has led the topic into the limelight. Now the analysis of user-generated content is among the priorities of various marketers. According to report by "Statista" Facebook had more than 2 billion users in the fourth quarter of year 2018. These figures clearly show that the digital space has taken over most of leisure. As a result, the mounting relevance of social networking has changed the communication patterns of marketers and consumers. Social media platforms do not only consist of Social Networking Sites but they also include Wikis, blogs, video streaming platforms, Virtual reality, etc. As social media has already been a crucial part of Information system, it has become an amazing medium to reach consumers, voters, fans, etc. Marketers are using social media platforms as rich source of gathering information about consumers as what they prefer and what they purchase. Profit businesses are beautifully exploiting social media for product design, innovation, marketing, and relationship management. Social networks facilitate the interaction between mass media and personal information channels.

Perdue (2010) states that the popularity of interactive communications and social media has triggered the use of informatics to gain profits out of that. The intensification of research is the area of social media is the result of huge opportunities and challenges associated with it. This topic of research is multidisciplinary in nature and has attracted almost all other areas.

As the number of social media platforms is increasing continuously it is becoming important for businesses to take benefit of these sites. The analysis of data generated on social media platforms is the need of the hour. Zeng et al. (2010) stated that from the marketers' point of view, social media analytics and social media intelligence are the two weapons that can help them to reach target audience at the right time and at the right place. Social

media analytics is concerned with the development of the tools that can easily collect the data and analyse it into meaningful insight. It includes collection, summarization, presentation, and interpretation of the data in a goal-oriented manner. Social media analytics helps in communication among various social communities and extraction of meaningful patterns for an organization. The swift growth of mobile phones is making it all the more convenient easier for consumers to share their experience and opinions. Although there is a huge amount of data that is available on various social networks, it has always been a challenge for the marketers to analyze the voluminous data and draw conclusions. Social media analytics makes use of technologies, algorithms, and toolsets to analyze the data from various social media platforms. social media data is undoubtedly the richest and finest source of information about human behavior and gives opportunity to marketers to understand its customers and their sentiments more clearly.

Industrialists and researchers are continuously working on finding new ways to automatically gather and analyze this treasure of data. Earlier only finance and retail companies were among the businesses used to analyze social media data about their brand awareness and customer relationship management. In finance the social media data is used to measure market sentiments and for trading most of news data is being used. With the advent of social media, companies have realized that data can come from anywhere, be it inside the company or outside the company. Due to the bombardment of data, marketers are experiencing a push to make data-driven decisions. Data-driven decision making is not that simple as it seems to be as it's not always easy to convert it into actionable outcomes.

The most popular use of social media analytics is the mining of customer sentiments to know the extent of loyalty and in return support the marketing activities. The process of social media analytics starts with the identification of business goals. Some of the common objectives include a reduction in costs, increased revenues, increased brand loyalty and customer services, etc. once the goal has been identified the second step is to define the key performance indicators that will help the marketer to evaluate the data. Social media analytics use many metrics to track data. Some of the business metrics may include the number of followers, or the number of likes or shares, and mentions of the company's name. these

metrics are considered to be simple and straight tools of analysis. One of the more advanced types of tools available is Sentiment analytics. This advanced tool uses machine learning algorithms to understand the true motive hidden behind a statement. These outcomes generate a quantifiable score of sentiments and help the marketer to better connect with its customers.

As the number of marketers relying on social media analytics is ever-increasing, some popular open platforms such as Python and R are serving marketers very well. Tremendous growth has been observed in the area of analytics. The main problem faced by data miners is the natural language and unstructured data available on social media platforms but the machine learning and artificial intelligence have made it much easier to convert data into something meaningful. These advanced tools and techniques allow organizations to extract data without depending upon polling and surveys.

The first step during the process of social media analytics is to focus on the business objectives that can be improvised by taking the benefits of the data. Some of the standardized goals include maximization of the business earnings, minimization of the customer expenditure, getting feedback from the consumers, altering the customers' opinion, etc. there are many advantages of introducing social media analytics into the business. Some of them are:

Competitive edge over others: Social media analytics allows businesses to have a competitive advantage by enabling them to better understand their brands. It mainly includes data relating to customer's needs and how they use a particular product and service. Learning from Users: As the concepts of marketing are still evolving, it has been seen that customers are the solution providers. Customers have become very reactive to every product and service they get and post their feedback on various forums.

Improvisation: This is the crux of Social media Analytics. There is a voluminous data available on various platforms that contain comments regarding various brands. These comments consist of a wide range of sentiments that can be used to improve products and services. Thousands of Instagram posts, Facebook shares and tweets are talking about products and services each day. Social media sentiment is feeling and attitude of people towards a product they are talking about. Social media analytics adds

meaning to all these posts, tweets and shares. It makes the marketer aware of its position in the minds of the customer and moreover helps to know whether they are able to communicate to their customers in a way they were supposed to.

Batrinca & Treleaven (2015) Sentiment Analysis is one of the most powerful tools available to analyze social media content. Sentiment Analysis is a process that helps in defining a statement whether it is positive or negative or neutral. Sentiment Analysis uses an algorithm that combines Machine Learning techniques and Natural Language Processing to analyze various statements and assign scores accordingly. Sentiment analysis is a technique that helps in gauging public opinion within large enterprises, keeping an eye on product and brand reputation and conducting market research. Sentiment analysis is an analytical form of opinion mining. Basically, it is a technique of transforming emotion tone behind a statement and use to understand the attitude.

The present study aims at providing an efficient way to grab people's views and analyze them to draw meaningful insights. This paper runs an algorithm on online views of a product and predicts how many people are talking positively about a product and how many talking negative. The paper also helps marketers in predicting the success of a new model launched. The study analyses different patterns of communication in terms of its intensity and positivity. The remainder of the paper is organized as follows: Section 2 of the paper reviews the literature related to social media analytics and sentiment analysis. Section 3 of the paper develops appropriate methodology that can serve the optimum analysis of people's opinions and predict the success of a product. Section 4 discusses the findings of the study and section 5 deals with the final conclusion of the research and also talks about the limitations of the present study which can be improved in further research in the future.

2. REVIEW OF LITERATURE

As social media has become a critical part of people, it becomes all the more important for marketers to encash this opportunity. For many people, the world of social media has become the source of information and consider it a great source of economic and social exchange. Wigand et. al. (2010) in

their research found that the rapid growth of social media channels is inviting scientific analysis. Kaplan and Haenlein (2010) discussed that with the widespread and ease of internet access, personal publishing has become popular. People have become super-active on microblogging and social networking sites.

Agrawal et al. (2011) found that with the advent of social media, the way marketers used to collect and analyze the data has been entirely changed. Now they have open access over the opinions users share via social networking. Gruhl et al. (2010) and Larson and Watson (2011) stated in their study that opinions given by people on various social networking platforms are not only helpful for governmental institutions but also very helpful for profit making organizations. Gruhl et al. (2010) indicated that most of the business houses take advantage of social media as a rich source of information and to market their offerings. Marketers consider social networking sites as a vital thread of business intelligence fabric. Stieglitz and Xuan (2012) found that there is already a variety of social media analytical tools available for business and marketing institutions but there is a lack of same in political context. Surowiecki (2004) and Manski (2006) acknowledged that opinion of crowd is quite an effective mechanism of predicting future. Krauss et al. (2008) admitted that views collected from a large group of people not having expertise can be proved to be a better predictor of the future than few experts. This practice has been facilitated by the emergence of social media and other micro blogging platforms which can help marketers to have first-hand information. Leskovec (2011) and Nagarajan et al. (2011) explained that the user-generated content and multimedia sharing applications such as Instagram and Youtube are producing voluminous data every day and helping marketers and users both. However the task of extracting relevant information has always been an issue to the beneficiaries.

According to Zeng et. al. (2010) Social media analytics "is concerned with developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data … to facilitate conversations and interactions … to extract useful patterns and intelligence…". Fan and Gordon (2014) proposed in their study that social media analytics is a process that has to follow three stages namely Capture, Understand and Present. The first and foremost stage is about gathering data

from various social, media channels and extracting the relevant content. The data collected in the first stage is not always relevant so, in the second stage, the marketer understands the data properly and removes the data that is not relevant to the case. The last stage is concerned with presenting and displaying the final output and insights drawn out of it. Zeng et al. (2010) states that Social media analytics has to face many challenges like bombardment of data on social networking platforms, which is not capable of being treated systematically. Secondly, social networking is a human-centric activity that may lead to issues such as "context-dependent user profiling" which needs to be examined again. Thirdly, despite promising features of social media, issues like lack of structure, inaccuracies, and inefficiency in collecting and interpreting different kinds of signs are critical to analytics. Lastly, sheer the volume of the data is a great challenge for marketers.

Various social media analytics techniques have been proposed by many researchers in the existing literature. Some of them are being discussed here. Fan and Gordon (2014) explained that opinion mining or sentiment analysis is a technique that supports the second stage of the social media analysis process i.e Understanding. It is one of the most popular techniques available to analyze data captured from social media platforms. It uses Natural Language processing to mine out user sentiments and opinions about people, ideas, services, and products. Gayo-Avello, (2011) explained some of the simple data analysis techniques such as word counts which assumes that the more people discuss the brand the more they like it. He also talked about polarity lexicons which count the positive and negative words mentioned with the brand name.

Turney (2002) states about semantic methods that can be used to analyze data in his study of reviews. It involves the computation of lexical distance between various negative and positive emotions. Blei (2012) and Wallach (2006) have been talked about a technique called "Topic Modeling". This technique is used to grab relevant things from voluminous data and sense prevailing themes. These themes can further help marketers to know about user's interests.

Bonchi et al. (2011) proposed a new technique of social media analysis which may sound similar but is slightly different. The technique is called"

Social Networking analysis". The technique is used to know about various social networks and connections which can help marketers in identifying the important nodes within a network. It analyses the relationships between two users so that marketers can target more influential people. It can greatly help companies in predictive modeling and targeting people more accurately. Scott (2012 also proposed various simple and sophisticated techniques of social network analysis in his research. Fan and Gordon (2014) identified "Trend Analysis" as one of the simplest techniques that can easily analyze the historical data and predict future. Anderson (1971) proposed regression analysis and time series analysis can be used to analyze the trend. Grossberg (1988) also proposed a method that can help marketers to use the same in their own way and that is "Neural Networks". Thomas and Cook (2006) defined "Visual Analytics" as "the science of analytical reasoning facilitated by interactive visual interfaces". The above techniques help in the third stage of the social media analysis process i.e., Presentation of the data. It also helps in data reduction and decision making. As there is number of techniques available, user-generated in accordance with the need and the stage in the social media analytics process.

Liu (2010), Pang and Lee (2008) and Stieglitz and Dang-Xuan (2012) identified that sentiment analysis as a tool of analytics has emerged in the recent past. It helps marketers to seek views, attitudes, emotions, appraisals, events, etc. Liu (2010) observed that it has been a tedious task to extract appropriate comments and organize them to interpret easily. There is a strong need for customized software that can summarize the data into meaningful insight. Pang and Lee (2008) opine that this powerful tool enable the classification of sentiments and subjectivity that treats every case as a text classification case and it analyses every document as a text problem containing various positive and negative emotions. Stieglitz and Dang-Xuan (2012) stated that in spite of its popularity and ease, sentiment analysis has to overcome many challenges like the use of emojis, informal texts, slangs, etc. even the situation worsens when an opinion goes in two different contexts.

Most of the researches in this area are concerned with the overall sentiment of a statement i.e whether the opinion formed is positive and negative. The present study follows an approach to arrange the tidy data structure on which the sentiment analysis may run software as an inner join.

3. OBJECTIVES OF THE STUDY

a. To understand the relevance of social media analytics for marketers

b. To explore tools available for social media analytics

c. To identify use of sentiment analysis to gather opinion of users about a particular product.

d. To identify which feature of a product is most talked about.

4. RESEARCH METHODOLOGY

The present research follows an exploratory approach of research design where an extant review of literature has been conducted. Many quality researches have been accessed through J STOR, GOOGLE Scholar, Science Direct and EBSCO etc. After the review of literature, a gap has been identified where social media could have been used as a primary tool of opinion mining. The current research addresses the gap. The present study is based upon user's opinion that have been captured from a social networking platform i.e Facebook. Facebook allows its users to create pages and share posts about the products and brands they like. Facebook was launched back in 2004 on 4th of February by Mark Zuckerburg. The speed by which Facebook has grown is phenomenal. According to a report published by facebook on 24th April 2019, It has over 2.38 billion monthly active users. The number of users is increasing at the rate of 8% year over year. It also revealed that 5 new profiles are being set every second on Facebook. This statistic poses great potentiality facebook to various marketers. When marketers read a review or an opinion about their product, they usually classify that as positive or negative feedback. Feldman (2013) proposed that brand sentiment analysis can be performed to know the different sentiments about different features of the same product. There are various software that can help various brands to know their worth.

One such software is R that is being used for sentiment analysis in the present research. R is an open-source programming language and free software that can be used for data mining and visualizations of the data. The software takes the tidy text as input and arranges the data in a meaningful manner. This allows marketers to churn the data and find out most frequent

words used in the file. One and most common technique of mining the data using R is to cogitate the data as a blend of sentiments and words. The software already contains variety of words in its dictionary known as lexicons. The three lexicons that are generally used are AFINN, Bing, and NRC. All three lexicons are based on unigrams. All of these carry many words of English vocabulary that contain scores based upon their negative and positive emotions. It also categorizes various words in categories like anger, joy, sadness, happiness, trust, etc. the software classifies the data into binary fashion. The main function of first lexicon i.e AFINN is to assign words a score between -5 and 5 where the – sign indicates a negative emotion.

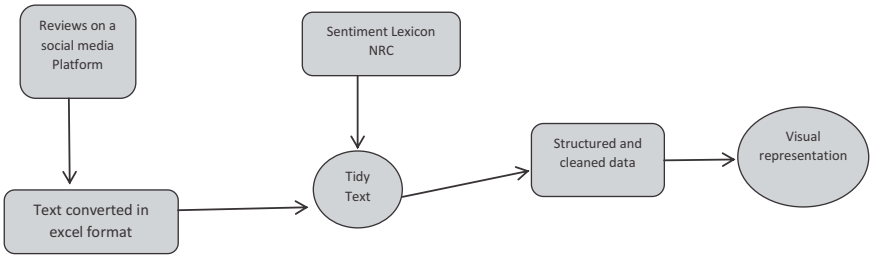
It has been observed that not all the words in the English language can be interpreted used lexicons as many of them show a neutral emotion. It is also to be noted that sometimes positive and negative emotions can jointly result in a zero. Another approach that is being used by R while performing sentiment analysis is by performing an inner join function. It helps the marketers to remove stopwords by performing antijoin operation.

The software also allows marketers to add their own lexicons based on their specific areas of interest. The existing lexicons are established by either crowdsourcing or work of an author which is later being validated. The software also allows access over some specific lexicons based upon some specific themes.

The present study uses NCR lexicon to classify the sentiments as negative and positive. The research has been conducted on the reviews collected from a Facebook page name as “IPhone x” where various users reviewed and recommended the IPhone x. All the reviews related to IPhone X were being imported in an excel file from an official page. Then the comments were being arranged in a prescribed format. Data cleaning is one of the most important parts of any analysis so the data was being cleaned by removing irrelevant reviews including emoticons and slangs. Many reviews were present in languages other than English, so they were converted into the English language. After that the file was being imported to R open source through a function of “read_excel” which helps it in reading the excel file. Then a function of data cleaning was performed to remove irrelevant words like “Now”, “Know”, “will” and “also” etc. These words were removed

using a function of "stopwords". A package named "wordcloud" was being installed to make a wordcloud of the most frequently used words. Similarly a called "treemap" was also being installed. The software allows us to print as many words as we want so in this case up to top 20 words have been printed. A correlation matrix has also been generated using a function of "cor_word" where correlation between two words has been obtained. The following figure shows how the Sentiment analysis has been performed on the data and final outputs have been obtained.

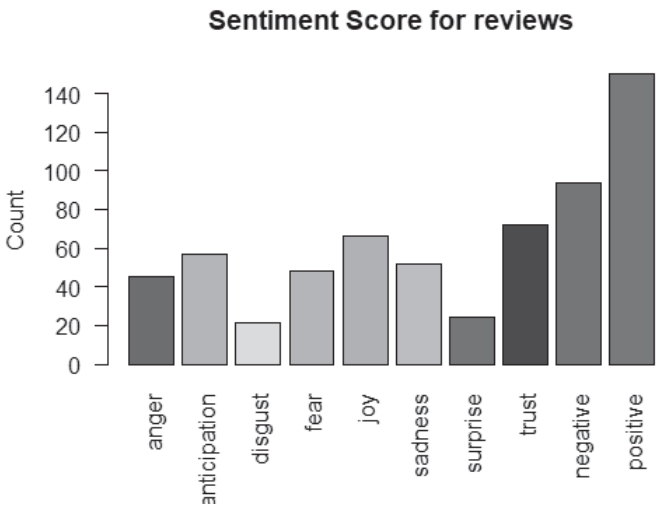
Figure 1: Flowchart showing the process of sentiment analysis in R



5. Findings and Discussion

The object of the present research is to use sentiment analysis for understanding the customer opinions about a product i.e Iphone X. The reviews were collected from a famous Social media platform and then analyzed using a software R. The software used a predefined lexicon to draw inferences about people's opinion whether most of people are talking positive or negative about the product. The following bar diagram shows the overall sentiment score of the reviews collected from Facebook. The lexicon used here has not only bifurcated the reviews into negative and positive emotions but also classified them in various emotions i.e., Trust, Joy, Fear, Anger, etc. It has been observed that most of the people are talking positively about the IPhone X while very few found it disgusting.

Figure 2: Bar Diagram showing the overall sentiment score of reviews



From the above bar diagram, it can be concluded that the words carrying positive emotions are used more frequently in the reviews. The words like fear, Disgust, anger, and sadness are among low scoring emotions. The neutral emotion like a surprise is also scoring low in the given case. Marketers can use the above sentiment score to know about the overall sentiment of its users and can modify the item accordingly.

The following diagram shows the frequency of a word by which it has occurred in the reviews. The research observed that IPhone and Phone are the words that are most frequently being used in the reviews. As the data was retrieved from a page named Iphone X it is obvious to get these words as the most frequently used words. Apart from these words "love", "camera" "best" "great" "Screen" words are also used frequently while "bad" "worst" and "expensive" are the words that are not used much in the reviews. Marketers can use the above information to find out the most frequently discussed feature of their product and can capitalize on it. In the above case, it can be clearly seen that people have used positive words for the product. It also shows that the product's screen and camera are the features that are being discussed by people actively.

Figure 3: Most frequently used words and their visualization through treemap and word cloud.

Similarly, the table given below can be obtained by a function of "dtm matrix", "rowSums" and "number of occurrences" which shows the number of occurrences of each of these words. With the view of convenience, only the top 20 words have been displayed here. The table clearly distinguishes between the positive and negative words by showing their exact occurrence. The word "Best" has been used 12 times whereas the word "worst" has been used only 7 times.

Table 1: Showing the exact frequency of the words

iphone	41
phone	39
apple	20
camera	15
best	12
back	11
really	10
love	10

great	10
like	10
bought	9
screen	9
please	9
plus	8
face	8
help	8
one	8
made	7
worst	7
battery	7

So far the paper discussed various functions to access the emotional value of individual words. Now it would analyze reviews in pairs of words that occur together in the data. The next function that has been applied to the review data is that of correlation. Correlation or word association is considered to be a useful function for sentiment analysis. It establishes a relation between two words. The function of "cor_word" and "findAssocs" was applied to obtain the following table where the correlation with the word "apple" has been extracted out. The following table shows that the word "apple" is strongly correlated with the word "glass" which means the glass back of IPhone X has been there in the limelight. People are discussing the glass back and its attracting customer's views.

Table 2: Correlation matrix of words associated with the word "apple"

glass	0.7
months	0.68
fix	0.62
sell	0.61
days	0.6
one	0.6
thing	0.55
tell	0.53
talk	0.51
expensive	0.49
case	0.44
broke	0.42
cover	0.42
took	0.42
camera	0.41
back	0.41
never	0.4
service	0.4

The above table also brought us to the conclusion that the word apple has a correlation with the word "expensive" too. They are 0.49 correlated which shows that these two words are occurring frequently in the reviews. A marketer can interpret as an indicator of apple being a little expensive than other brands. Similarly correlation with another word can also be obtained. For example if a marketer wants to know about a particular feature of the

product then he/she can find the association of words with that feature i.e., screen, camera, battery, etc.

6. CONCLUSION

The above study contributes to the field of marketing. It does not only help marketers to know the feedback of their customers but also helps them to know what potential customers might be looking for in the product. The study shows how a social media platform can help knowing people's opinions and provides the first-hand information. It has been observed that these reviews are more reliable than any survey. As the scope of social media marketing is ever-increasing, many new platforms are being introduced every year. And with this explosion of the platforms, user base has also increased manifolds. According to a report by Alferd Lua (2019) Facebook has more than 2 billion monthly active users and Tik Tok was the most downloaded app in the first quarter of 2018. With the growing users, marketers have also become over-activate and keeping a constant eye on what is happening over these platforms. According to report " Social Media Marketing Industry Report" published on May 2019 by "Social media Examiner" The 85% of the marketers are interested in knowing the best ways to engage the audience, effective social tactics, improving their organic reach, acquiring new customers, measuring and analyzing the social activities, using social ads effectively and creating videos. To answer all of these questions there is a need for a strong analytical sense among marketers. Our study also contributes to the above questions by showing the preferences and opinions of different users towards a particular brand. From an academic point of view, the study is of great relevance for the academicians as it is one of the few studies on social media analytics that are done in India. The analysis done in the present study can be performed on any set of reviews whether they are towards a product or towards a person or an idea. Further, It can be concluded that the sentiment analysis done here can help in Business and various marketing activities.

7. LIMITATIONS AND SCOPE FOR FURTHER RESEARCH

While this study contributes much to the field of analytics it still has some limitations.

1. The study shows that most of the reviews reveal that people hold a

positive opinion about the IPhone X but the sample size is limited to 200 reviews. So there is further scope of research where the sample size can be increased.

2. It takes reviews from only one social media platform. Different views from various social media platforms can be taken and then analyzed to have a broader view of reality.

3. One major limitation of sentiment analysis is that it does not give a clear view of sarcasm and can give misleading results. So It can be concluded that there exist a lot of scope for improvement in this area as human behavior is one of the trickiest things to predict.

4. In future research, more sophisticated techniques of data mining and analysis like Topic modelling or linguistic analysis can be used.

8. MANAGERIAL IMPLICATIONS

The present research can help marketers to know their customers better. The research findings shall contribute in taking policy decisions by stakeholders and understand customer feedback in a systematic manner. This would not only help to make improvements in the current product but also help in new product development by seeking customers' expectations from a product category.

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