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A REVIEW ON THE CONCEPT OF SENTIMENT ANALYSIS AND ITS ROLE IN MARKETING STRATEGIES FOR E-COMMERCE

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ABSTRACT

Sentiment Analysis is considered as a critical research technique for collecting and analyzing textual data that is available on social websites. SA is also used as research method that systematically evaluates the consumer opinions in real sense in an efficient and effective manner. Marketing experts can collect rich data on attitudes and opinions about the products and services which help them in taking a relook at features which are positive and negative and use this as feedback system to rectify anything. By identifying the polarity of opinion either positive or negative will help businesses to identify right strategies to make their brands appreciated better by consumers. This review paper focuses on evolution of sentiment analysis, synonyms and why it is used and how research has happened related to how SA could be used in e- commerce.

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INTRODUCTION

Even though Sentiment Analysis is looked at as active tool in data mining, web mining and text mining in Computer Science, its role is business especially in e-commerce is very critical. Basically SA is a type of natural language processing (NLP) for understanding the attitude or opinion of the people about a particular product or service or even a topic [1]. Due to constant development in online media, users are seen to be more dynamic and consistent in giving out and sharing their opinions on products and services with several platforms such as blogs, product reviews, wikis and Twitter. This specific information could be defined as User Generated Content (UGC). UGC "refers to media content produced by users to share information and/or opinions with other users". In E-UGC both positive and negative information is separated and made available for information searchers to read. Furthermore, this E-UGC is more keenly available through internet for product review [2]. According to Floyd et al., (2014) E-UGC enables customers to obtain more elaborate information on a product. Many Businesses to Customer (B2C) websites offer video and photo upload features in their review sections to feel the pulse of the customers.

The growth of Social media such as Blogs, forum discussions, Twitter and other social networks has made Sentiment Analysis very important to the business decisions. Managing the huge volume of opinionated data recorded in digital form has become very critical to business houses in terms of product launch to feedback on the product preferences by customers. In marketing the Sentiment Analysis helps in judging the success of a product or service by reviewing the opinions posted by users in social media. This also helps in identifying the demographics which like or dislike particular features of a product.

Sentiment analysis is a part of Natural Language Process (NLP) that draws a tactics from information recovery and computational syntax to identify opinions expressed in text. It is considered as a specific type of text mining [3], and it has been called opinion mining. Text mining is majorly used to detect the sentiment (reaction) of customers towards the products and services or in the related domain of sentimental computing. While the terms evaluation abstraction or review mining have also been applied, they are not always completely correct [4]. The

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main goal of sentiment analysis is to identify positive or negative overall attitudes or opinions toward a brand, product or service based on text comments [3].
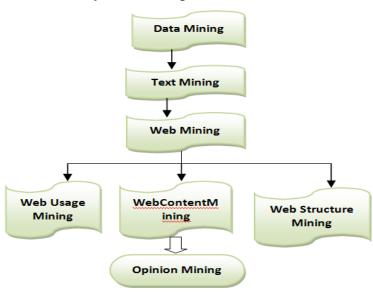
ORIGINS OF SENTIMENT ANALYSIS

EUCLIDEAN DISTANCE

The rapid growth of Web information led to an increasing amount of user-generated content, such as customer reviews of products, forum posts and blogs. Sentiment analysis—automatically identifying the emotions conveyed by a text, and in particular distinguishing positive from negative valence—has become one of the most popular research areas in computational semantics both because of the interest of the field in the interplay among emotion and cognitive abilities, and because of its understandable applications (e.g., companies could analyze social networks to determine customer response to their products). Such research however requires collecting judgments about the valence of sentences and possibly lexical items, and simply asking subjects often results in low inter-annotator agreement levels. Sentiment analysis seems to originate from opinion extraction called synonymously as opinion mining, sentiment mining, and subjectivity analysis. Opinion mining also called as SA is a process of finding users opinion about particular topic or a product or a problem. A topic could be a news, event, product, movie a hotel in a specific location. User's opinion is expression of their emotion, attitude on anything in social media which gives opportunity to people to voice their feelings. A thought, view, attitude or comment without a reason but with an emotion is sentiment [5].

According to Khoo et al., (2012) data mining and machine learning algorithm are used to detect sentiment strength and sentiment analysis. These algorithms are rationally effective for sentimental analysis [6]. Even simple algorithms are shown to work well with large data sets, as in the case of the naive Bayesian approach. Most difficult algorithms are also needed for specific circumstances.

Taking opinion on a movie, a product, public sentiment or politics and prediction of election outcomes etc help in analyzing the positivity or negativity of people attitude. Emotions include feelings like anger, sadness, joy, fear, shame or proudness in human being. Moods are diffused non-caused low intensity long duration change in subjective feelings which are cheerfulness, gloomy, irritation, depression or buoyant. Attitudes are enduring affectively colored beliefs, dispositions towards objects or persons include feelings like liking, loving, hating, valuing and desiring. Personality traits are stable personality dispositions and typical behavioral tendencies influence how people attitudes are formed. They are nervousness, anxiety, and recklessness, morose, hostile, and jealous. SA helps in detecting the attitudes towards Holder (source) of attitude, Target (aspect) of attitude and type of attitude in a polarity between positive, negative and neutral.

Table: 1. Title: Hierarchy of Data Mining

LITERATURE REVIEW ON SENTIMENT ANALYSIS

A study was made on Sentiment analysis by Jeevanandam Jotheeswaran, Dr. S. Koteeswaran (2015) highlighted the classification of opinion mining as corpus based approach: determining words emotional affinity to learn their probabilistic affective scores from a large corpus. Dictionary Based Approach is used in lexical resources like Word Net to automatically obtain emotion-related words for emotion classification. Feature based opinion mining: Using Opinion Mining, a review is evaluated at 3 levels- document, sentence and feature levels. Evaluating a review at document level, the entire review is classified positive or negative based on opinions expressed in that review.Haseena Rehamath (2014) [7] has identified product purchase, quality improvement, market research, recommendation to other customers, opinion spam detection, policy making, decision making as application areas for which Sentiment analysis can be used effectively.

Darena and Burda, (2012) derives, coarse-grained and fine-grained are the two ways to conduct sentimental analysis in the field. Aim of Coarse-grained sentiment analysis is to predict the overall sentiment opposition of a document by using statistical method, unsupervised, semi-supervised or supervised machine learning methods (Moghaddam and Ester, 2010; Turney, 2002; Chen et al., 2012; Kim and Lee, 2014; Sayeedunnissa et al. , 2013). Kanayama and Nasukawa, (2012) describes, Fine-Grained sentimental analysis is used to spot the sentiment strength and its opposition towards particular product features in word level. Machine Learning and semantic analysis are the two common methods used for sentimental analysis (Pang et al., 2002; Zhang et al., 2011; Yu and Hatzivassiloglou, 2003; Ding et al., 2008). From the former unsupervised method attains the classification accuracy of 74% on average for 410 reviver's view, where the accurateness of movie, bank, and automobile reaches 66% and 80% respectively.

There will be a change in the performance depends upon the domains (Turney, 2002). According to Thelwall et al., (2010) the senti-strength can detect the positive feeling at 61.03% and negative feelings at 73.56% accurately in Myspace short text. Hanshi Wnag et, all (2014) have proposed a feature based Vector model for Chinese reviews to understand the sentence structure and content to solve ambiguity of emotions which helps in identifying polarity of the opinion. They have successfully used this model to study opinions on E-journal, electronic devices and hotel service. [8]

Ravendra Ratan Singh Jandail (2014) [9] applied different levels of SA. He used document level, sentence level, entity and aspect level to study positive and negative, interrogative, sarcastic, good and bad functionality, sentiment without sentiment, conditional sentence and author and reader understanding points. Yajun Deng et all [10]vhave presented a dimension based Sentiment Analysis modal for E-Commerce reviews where dimensions mapping and sentiment word disambiguation are main challenges. They have used a real database of 28 million e-commerce product reviews. Svetlana et all (2014) have used SA to detect the sentiment in short informal textual messages as tweets and short message service (SMS) and sentiment in a word or phrase. [11]

WHY SENTIMENT ANALYSIS

Chuang. Any one wants to buy a product or searching for a hotel to stay while touring, they usually check the blogs or reviews made by the consumers who have used the product or availed a particular service. There are three levels of opinion mining at document, sentence and phrase levels [12]. The negative, positive, sarcastic, interrogative, good and bad functionalities, conditional sentences and author and reader understanding viewpoints are studied thoroughly in these levels. The opinions posted by people are retrieved from review websites and are processed through phases like opinion retrieval, opinion classification and opinion summarization about a product or topic. The techniques used in opinion mining are supervised machine learning, unsupervised learning, and case based reasoning.

Online product reviews are done for electronic goods, real estate, movie reviews, automobiles and also Durable consumer goods. For example sentiment for a movie review could be taken from tracking sentiment flow from one sentence to the next [13]. Hanshi wang et al have done a study on evaluation of effectiveness of sentiment analysis in Chinese language related to customer reviews in three domains i.e., electric devices, E-journal and hotel. They have extracted 1375 documents which consist of both positive and negative sentiments.

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Table: 2. THE SIZE OF THREE SENTIMENT CORPORA

Date sets	Sentiment	Documents
Electronic devices	positive	356
	Negative	306
Hotel	Positive	180
	Negative	218
E-Journal	Positive	139
	Negative	158

E-commerce websites are been widely used by the customers to know about the product reviews and there service feedback, which is used to guide the customers to buy the product and services. Majorly 75% of the customers are visiting the e-commerce websites for review guidance (Gretzel and Yoo, 2008). E-commerce leads to the essence of eWOM: where the buying behavior of one customer is affected due to informal communication via internet reviews (Litvin et al., 2008) and eWOM users can freely share their views on various brands, products and services through online [14].Due to this eWOM consumer – generated content, there will be a direct influence on product sale (Zhu and Zhang, 2006). Thus, online reviews are more important to the consumers and sellers to know about the feedback on product and services. Various studies have been undergone on product recommendation by one customer to other via online reviews; such reviews will act as a most influence part in customers buying decision. According to Ghose et al., (2009) ratings or numberings are more important to review the feedback of the product and services. Ghose and Ipeirotis (2011) describe that user perseverance and influence of sale using online comment is found through readability, subjectivity and linguistic correctness of text comments which make a difference on it.

Text comments will be priorities and can be quickly added on the website, such that the user cannot handle the full range of comments, for example: recent comments of the product and services will lead the review display. It is impractical for the prospective consumers to go through all the large number of reviews about a product quality and services through online reviews. This problem can be solved, where the large number of reviews and comments are synchronized to a clear picture with numerical ratings will make the consumer much easier to analyses about the product quality and its services. These are the major disadvantage of text comments on online reviews. Where, sentiment analysis seems well suited to this task, but it has yet to be validated for converting text opinions into numbers.

THE ROLE OF SENTIMENT ANALYSIS IN SOCIAL NETWORKS

The role of sentiment analysis is analyzed in social networks like Facebook, Twitter, LinkedIn, you tube, Myspace, Blogs by in their study where data collection process, text pre-processing, classification algorithms and performance evaluation results are used to achieve accuracy levels in polarity of opinion [15]. In their study on Sentiment analysis in social streams, Hassan Saif, F et al have explained how SA tasks are more difficult in social streams than other classic text based opinion mining techniques. The social streams use vocabularies and expressions that are not in the formal language expressions and may lead to complex dynamics in the individual and community Opinions and sentiments [4]. It is an established fact that social communities have profound influence on consumer behavior which is accepted by market researchers and academicians. They can collect large amount of data and unobstructed with less cost and errors while reliability and validity are enhanced [13], [7]. Few examples of how sentiment analysis helps marketers to understand the polarity of opinions.
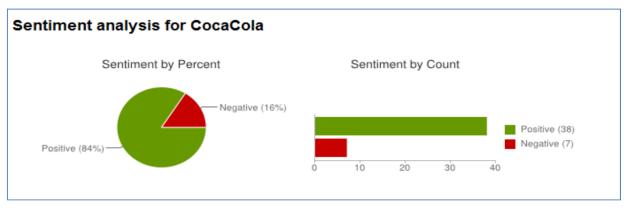
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Figure 3: Summary of sentiments on a single product
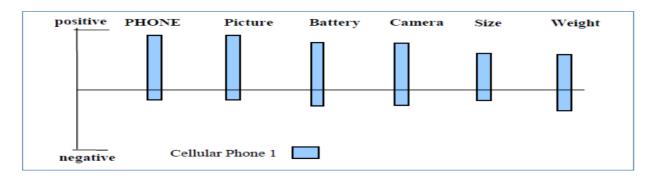
Source: http://www.sentiment140.com/

Figure 4: Summary of sentiments on features of a single product

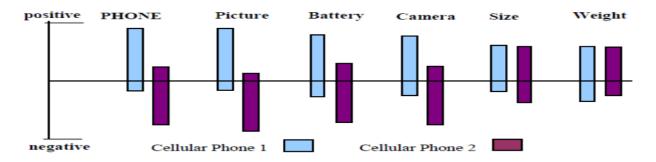**(Source: Lu, 2010 p.8)**

Figure 5: Summary of sentiments comparing two products

(Source: Lu, 2010 p.8)

SENTIMENT ANALYSIS IN MARKETING STRATEGIES IN E-COMMERCE

E commerce plays a very vital role in marketing now. The consumer behaviour in online buying decision is influenced by both internal and external factors. External influences include demographics, socio economics, technology and public policy, culture-sub culture, reference groups and marketing. Internal factors include variety of psychological processes like attitude, learning, perceptions, motivation, self-image and semiotics. The internal influences play a key role in sentiment analysis [16]. The traditional shopping depends on factors like one stop

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shopping place to save time, free parking place and offer of wide variety of products at a comfortable price. But online shopping gives freedom to consumer in terms of convenience and interactive services.
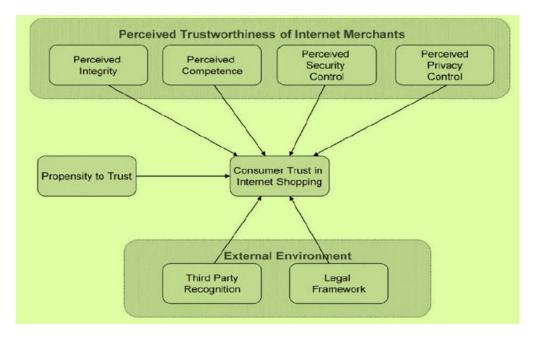

Fig: 6. An Integrative model on Consumer trust in internet shopping. Source: Arjun Mittal, Global Journal of Business And Management Studies P- 135

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Many companies are now more interested to use sentiment analysis to develop marketing strategies by assessing and predicting public attitudes towards their brands. The company websites are gearing up to provide tools that track public view points by offering graphical summarization f trends and opinions in blogosphere [5]. The consumers usually prefer to compare specific features of different products as the Apple i-phone versus Samsung galaxy or to that extent compare sub features rather than giving opinions on whole item. The researchers should be able to construct comprehensive common knowledge bases to spot features and common sense bases to find polarity. The concept of "small room" is a negative for a hotel review but small que is a positive for Bank. Same way the sentiments should be read based on the context as Sentiment Analysis provides more insights to strategists to identify the gaps in their product or service.

E-Commerce is not only buying and selling of goods and services but also transmitting funds or data over an electronic network. E-Commerce in India has grown in sales touching nearly 20 billion dollars in 2015 with a growth rate of 700% in Asia Pacific region. Snap deal and Flipkart are two major players in India's e-commerce and now into mobile commerce. The Tweets were studied to identify the polarity of opinion on these two highly popular e-commerce companies which helped them to identify that the tweets made positive had a positive impact on the business they do[17]

The study made by [18] identified that more than 50% of the younger generation feel that social media plays a positive role in betterment and creating awareness about the latest trends in living styles. Social media sites are utilized by youngsters in terms of finding jobs, products for their needs, connect people from faraway places and also help in enhancing their skills. Hence Sentiment Analysis in social media sites is best bet for companies to connect with youngsters who form major chunk of their business.

The present generation customers spend more time on online to see the price variations of products and how face the negative messages have more impact on purchase intention rather than the positive messages [5]. The consumer intention to purchase is influenced by the blogs made many companies to move to create their own social media sites to host blogs. A customer experience is generated from a set of interactions between a customer and product, a company or part of its organization which provokes a reaction [8]. When the Word of Mouth

Marketing Association (2014) asked consumers what sources "influence your decision to use or not use a particular company, brand, or product," 72% claimed reviews from family members or friends exert a "great deal" or "fair amount" of influence [13]

SCOPE FOR FUTURE RESEARCH

The rapid growth of online communication has attracted the attention of Market researches to the tremendous value that opinion mining provides to vendors in analysing their products feedback provided by the users. In many Western countries the companies use Data Mining and sentiment analysis vividly in their market research. They use Sentiment Analysis to create and maintain review and opinion aggregation websites where the system continuously gathers a variety of information from the opinions expressed on the net such as product reviews, perceptions on brands and image issues.

The reviews written by the customers on blogs or social media sites have economic value as their opinions of positive or negative will influence the buying decision of the prospective consumers. But many studies have limited their scope to the influence factor of those reviews but not focussed on the predictive value of those expressions [19].

Once, the concept of "Word of mouth" by the customers has been carefully researched by marketing analysts to track public sentiments on a product or a service. Now opinion mining provides them a reliable, rich and quick data regarding the same. More than Market researches this opinion mining was critically researched and utilized by the Information Technology departments by using various techniques like Domain Driven Data Mining (D3m), Review mining, lexical affinity etc.

Companies will depend more and more on developing opinion tracking system as it helps them in analysing the information from blogs and websites about the trends in customers' opinions about products and services. Erik Cambria et al, have mentioned about the Multimodal Sentiment analysis which consists of linguistic, acoustic and video information. There is a great scope for further research on designing multimodal Sentiment analysis by corpora to find out broader sent of emotions and polarity of opinion [20].

CONCLUSION

Around 35 articles have been reviewed to understand the role of Sentiment analysis in designing marketing strategies for e- commerce. It is evident that in the era of social media networks the e-commerce is thriving because of netizens who spend more time on net to browse, find, review a product or service they want to purchase. In this process they go through the earlier experiences of customers who have already used the product or availed a service and read their reviews in various social sights.

The polarity of opinion of the customers expressed as messages is taken into consideration by companies to identify the opinions of customers which in turn is collected as data and analysed to understand what a customer is signalling the company indirectly. Hence sentiment analysis has become a very important research tool for businesses for designing their marketing strategies and it is done in a wise manner by lots of them on websites.

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