International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 Impact Factor: 8.176 ISSN: 2582-3930

Aspect Based Sentiment Analysis in E-Commerce Website

Aarati D. Fuse[1], Pradhumnta S. Arbat[2], Anjali S. Chaudhary[3], Anurag D. Kale[4], Ankush.V. Dahat[5].
[1]Student, P.R. Pote Patil College of Engineering Management, Amravati
[2]Student, P.R. Pote Patil College of Engineering and Management, Amravati
[3]Student, P.R. Pote Patil College of Engineering and Management, Amravati
[4]Student, P.R. Pote Patil College of Engineering and Management, Amravati
[5]Assistant Professor, P.R. Pote Patil College of Engineering and Management, Amravati

ABSTRACT— ***The rapid growth of Internet-based applications, such as social media platforms and blogs, has resulted in comments and reviews concerning day-to-day activities. Sentiment analysis is the process of gathering and analyzing people's opinions, thoughts, and impressions regarding various topics, products, subjects. Sentiment Analysis is the most commonly used approach to analyze data which is in the form of text and to identify sentiment content from the text. Opinion Mining is another name for sentiment analysis. A wide range of text data is getting generated in the form of suggestions, feedbacks, tweets and comments. E-Commerce portals are generating a lot of data every day in the form of customer reviews.***

Analyzing E-Commerce data will help online retailers to understand customer expectations, provide better shopping experience and to increase the sales. Sentiment Analysis can be used to identify positive, negative and neutral information from the customer reviews. Researchers have developed a lot of techniques in Sentiment Analysis. Mostly sentiment Analysis is done using a single machine learning algorithm. This work uses Amazon customer review data and focuses on finding aspect terms from each review, identifying the Parts-of-Speech, applying classification algorithms to find the score of positivity, negativity and neutrality of each review.

Then, it evaluates, compares, and investigates the approaches used to gain a comprehensive understanding of their advantages and disadvantages. Finally, the challenges of sentiment analysis are examined in order to define future directions.

Keywords: Sentiment Analysis (SA), Aspect based sentiment analysis (ABSA), Natural Language Processing(NLP).

I.INTRODUCTION

Sentiment Analysis is used to analyze data which is stored in text format. Text data can be in the form of customer reviews, complaints, feedback, discussions, tweets in social media etc. There isa lot of data that is being generated every day with the increase in human interaction in social media. Sentiment Analysis is also applicable to news articles, blogs, stock market, political debates, movie reviews etc. People these days tend to purchase products online, book hotels, tickets, cabs online which are generating data in the form of customer reviews.

Sentiment Analysis helps to find whether the reviews are Negative, Neutral or Positive. Analyzing this kind of data can help business in understanding customer perspective towards the brand strategies. Sentiment Analysis comes under Natural Language Processing that uses Machine Learning algorithms, Lexicon based algorithms and Hybrid algorithms to classify data.

Analyzing customer reviews plays a crucial role in maintaining product quality and to meet customer expectations. This helps the organization to increase sales. A lot of research till datehas been done on sentiment analysis. Researchers introduced lot of techniques, algorithms on sentiment analysis.[1]

II.OBJECTIVES

The main objective of this project is to accurately extract people's opinions from a large number of unstructured review texts and classifying them into sentiment class,ie,positive, negative, or neutral. Sometimes "highly positive" and "highly negative" and "neutral" comments are also considered. It can helps companies to automatically sort & analyze customer dataImprove customer experience This helps the organization to increase sales.

III .LITERATURE REVIEW

Feature extraction for entities is an important task for opinion mining.Lizhen Liu, ZhixinLv, Hanshi Wang[2] proposed a new method to deal with this problem. The new method uses the corresponding opinion words extracting the features, and according to mutual support and confidence to filter the noise.. Next, we will study theestablishment of two dictionaries by automatically and improve the precision and recall for the small scale corpus.they experimented various ways to incorporate the results from the aspect-based classifier into conventional tweet- level classifier. The experimental results suggest that a layered classification approach which uses the aspect.

To allow for a proper level of depth,Kim Schouten and Flavius Frasincar [3] focus the survey on a particular sub-field of sentiment analysis. Sentiment analysis has been studied mainly at three levels of classification. Sentimentis classified on either the document level, the sentence level, or the entity or aspect level. A focus on the first level assumes that the whole document expresses sentiment about only one topic. Obviously, this is not the case in many situations.

Toqir Ahmad Rana,Yu-N Cheah [4] found that Sentiment analysis in customer reviews is a challenging task in academia as well as in the industry and has attracted many researchers in the last decade. Many techniques have been proposed to extract aspects and grouping them in similar classes. Most of these approaches are limited to explicit aspects or largely depend upon lexicons.

The proposed of C.S.Kanimozh iSelvi system extracts [5]aspects in product customer reviews. The nouns and noun phrases are extracted from each review sentence. Minimum support threshold is used to find all frequent aspects for the given review sentences.

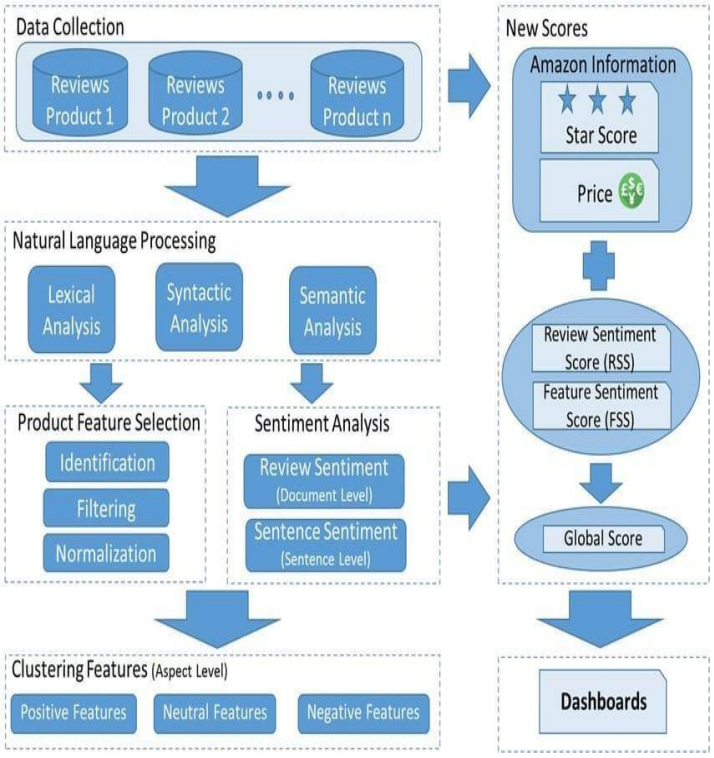
Subjectivity deals with extraction of subjective sentence and it is one of the important tasks in sentiment analysis which increases the system performance both in terms of efficiency and accuracy. Purtata Bhoir and Shilpa Kolte [6] have presented system which implements two different methods to find subjectivity of sentences. Among these two methods, Naïve Bayes classifier gives more accurate result than SentiWordNet.

As there is need to find different aspects of movie and its respective opinion, they implemented rule based system which allows user to easily check different aspect of movie liked or disliked by other uses.

Manju Venugopalan, Deepa Gupta[7] found that the hybrid tweet sentiment classification model incorporating domain oriented lexicons, unigrams and tweet specific features using machine learning techniques has been developed and the classification accuracies have been found to improve by an average of around 2 points across different domains.

The effectiveness of incorporating concepts of domain specificity in the polarity lexicon and the capacities of explicit tweet features to extract sentiment has been validated. Tweet specific features which include emoticons, punctuations, hash tags etc. have proved to act as complementary sources to extract twitter sentiment.

In the research of Vamsee Krishna Kiran M, Vinodhini R E, Archanaa R, Vimalkumar K[8] has presented a novel work on rating the product based on its technical specifications using opinion mining and natural language processing techniques. The purpose is to help the users in purchasing the desired product and also help the manufacturers to identify the buying experience of their products.



IV.SYSTEM ARCHITECTURE

Fig 4.1: System Architecture of Stock Price Prediction

1.Data Collectin stage:
we had a corpos of product reviewsas well as relevant information about each product Our proposalanalyzes these data and discovers new information that will help managers and users to make Deals.

2.Review Preprocessing Using NLP Techniques :
Using the textual reviews, NLP preprocessing is done. This consists of lexical, syntactic, and semantic analyses. The result of this preprocessing is a tagged word list with part-of-speech (POS) tags(lexical information) and semantic information of the different words.

3.Product Feature Selection Stage :
The identification of the product features was partially based on the methods used by Archak et all.These authors used a part-of-speech tagger to annotate each review word with its POS tag, identifying whether the word was a noun, an adjective, a verb, and so on

4.Sentiment Analysis Stage :
Two scores are calculated in this stage: (a) a global sentiment score for each review and (b) a specific sentiment score for each main feature of the product. In our experimentation, we used the abovementioned affective lexicon Afinn

5.Clustering Features Stage :
To evaluate the sentiment polarity of a product feature, the sentiment score of each phrase in which the feature appears is evaluated, and the average of these scores is calculated. This is done for each product feature. The features are classified as having a positive, neutral, or negative score.

6.New Score Stage :
In this stage, two new scores are calculated: the product feature-based score and the productglobal score. First, the feature-based score is calculated, a new sentiment score of a product averaging the sentiment score of all features of the product.

7.Dashboards Stage :
In the last stage, the extracted data are shown to the users. There are many possible dashboards available, such as word clouds.

These dashboards are very advantageous and have indications of positive/negative features about a product or even the ranking of the top products using the global score.

These dashboards are especially appealing for companies in terms of following up on the evolution of their productsaccording to consumer reviews, which can be deeply analyzed.

V .FLOWHART OF PROPOSED SYSTEM

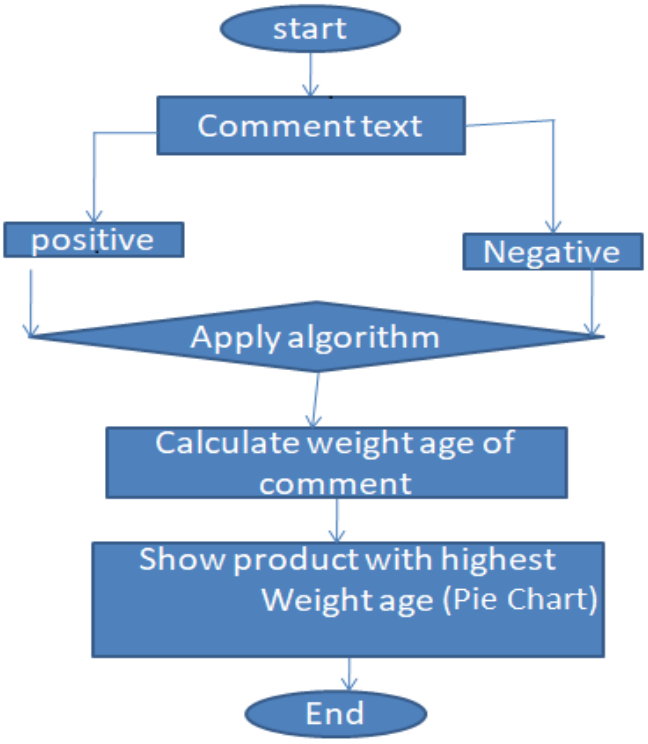


Fig 5.1 Flowchart of Proposed System

Fig 5.1depicts the data flow diagram of system. Suppose we comment the product then the comment will be positive or negative.After that with the help of algorithm calculate weightage using positive and negative words in the comment. And shows the highest weightage first in Pie Chart Which is shown in Fig.5.2

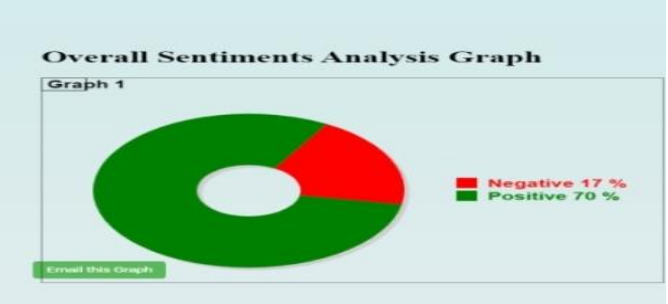


Fig 5.2 Overall Sentiment analysis Graph

VI. ADVANTAGES & DISADVANTAGES

ADVANTAGES

1. Improve customer experience:
Using sentiment analysis to reveal customer attitudes allows you to deal with resistance to your brand, products, and services head-on.This improves your customer's purchasing journey and their overall impression of your company, which means they'll want to visit again. They'll also want to share their positive experience with others

.2.Gain a competitive advantage:
Sentiment analysis provides continual feedback on where your company stands in relation to your competitors. More specifically, it identifies precise areas where you outperform rivals, and where you fall short. So, if your competitors are responding to customer queries faster than you, sentiment analysis lets you know promptly, so you can take quick action to deal with it.

3.Predict the future:
By evaluating the popularity of products and features and the tone of language used when commenting on them, sentiment analysis makes it possible to identify not only what's hot and what's not, but also what's only just beginning to heat up.The ability to make sales and campaign adjustments according to real-time data ensures you'll be ready for the latest trends before they happen.

4.Build a better brand:
Sentiment analysis helps you hone your products, services, and personality. Over time, this builds a reputation of a company that is ahead of the game, responsive to customer needs, and in tune with the mood of the moment.A strong and attractive brand like this gets noticed, draws in more customers, and increases positive chatter across social media and beyond.

5.Support shopper research:
A large part of the online shopping experience involves pre-purchase research by the customer. Analyzing customer feelings and frustrations at this early stage allows you to address the needs of potential shoppers throughout this crucial decision-making process.For example, this could be accomplished by providing convenient product summaries tailored to meet the needs of prospective customers.

6.Engage with customers :
Capturing the tone and subject matter of conversations in your customers' online communities allows you to connect with your audience through several online channels. Online engagement brings a whole range of benefits, including the ability to drive consumers to your website.

DISADVANTAGES

1.Sentiment Analysis based methods usually do not identify sarcasm, negation, grammarmistakes, misspellings, or irony.

2.As the whole classification is based on your tags and rules, you should have sufficient data tocreate a reliable dictionary.

3.They are very strict and domain-dependent in that a word is labeled as the same no matter the context. However, the term "amazing," for instance, can be either positive or negative, dependingon the context.

4.They are prone to human bias. For instance, if the people preparing the dictionary don't have sufficient domain knowledge, the method won't yield accurate results.

VII. CONCLUSION AND FUTURE SCOPE

CONCLUSION

In this, we have presented methodology of sentiment analysis and approaches based on previous studies in Ecommerce. Research results are to address customer satisfaction on online shopping platform based on other‟s reviews. Data analysis approach presents statical result for predicting and building strong confidence among customers who purchase product from online. Most researches have looked into many approaches and challenges, toward judging customers‟ behavior as discussed in different methods. The approaches are further applied in other field like Airline, Tourism, Hotel industry, hospitality and others. Sentiment analysis methodology and interpretation using analytic

tools perform accurate result to customers. Hence, there are many challenges and ongoing more research in this area have to be discussed and improved to produce more efficient and reliable sentiment analysis approaches.

The survey has explored a very important research domain in the field of NLP, i.e., Aspect-based Sentiment Analysis (AbSA); a subfield of sentiment analysis that has accomplished many excellent researches. The survey has stated the thorough overview of the recent progress in AbSA by depicting the state-of-the-art deep-learning techniques fashioned in locating the target, which can be an entity, or it can be an aspect related to a target or an entity,their relationships, their respective sentiments and sentiment evolution dynamicity. An issue-based categorization of the recent solutions is presented each contributing towards improving the process of aspect extraction, aspect sentiment analysis or sentiment evolution.

it is the process of extracting the opinions, emotions or feelings from a piece of text, which has made its signature in the modern e-world. Within SA, three levels of granularities are there, called document level, sentence level, and aspect level SA. The third one, ABSA is a much finer level of analysis where extractions of aspects and corresponding sentiments words and also the extraction of their polarity orientations are taken place. ABSA is trying to stand on its feet nowas many research works have already done over it in the past three to full.

FUTURE SCOPE

To achieve excellent performance from NLP and specifically AbSA requires a lot of effort. Aspect extraction and sentiment score determination are the core challenges of AbSA, which could not be handled through single-general solution. Instead, researchers should consider many sub-issues and sub-challenges for resolving the major challenges. These sub-challenges would develop an effective toolfor AbSA and increase the sentiment classification performance (to some extent) at aspect-level.

REFERENCES

[1] M. Sadegh, R Ibrahim, ZA Othman, “Opinion Mining and sentiment analysis”, InternationalJournal of computers and technology, vol.2,2012.

[2] Lizhen Liu, ZhixinLv, Hanshi Wang, “Opinion Mining Based on Feature-Level” 2012 International Congress on Image and Signal Processing, pp.1596-1600, 2012.

[3] Kim Schouten and Flavius Frasincar, “Survey on Aspect-Level Sentiment Analysis”, IEEE Transactions on Knowledge and Data Engineering, 2015.

[4] Toqir Ahmad Rana, Yu-N Cheah, “Hybrid rule-based approach for aspect extraction and categorization from customer reviews”, 2015 9th International Conference on IT in Asia (CITA), pp.1-5, 2015.

[5] A.Jeyapriya, C.S.Kanimozhi Selvi, “Extracting Aspects and Mining Opinions in Product Reviews using Supervised Learning Algorithm” 2015 2nd International Conference on Electronics and Communication (ICECS), pp.548-552, 2015.

[6] Purtata Bhoir, Shilpa Kolte, “Sentiment analysis of movie reviews using lexicon approach”, 2015 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC), pp.1-6, 2015.

[7] Manju Venugopalan, Deepa Gupta, “Exploring sentiment analysis on twitter data”, 2015 Eighth International Conference on Contemporary Computing (IC3), pp.241-247, 2015.

[8] M. Vamsee Krishna Kiran, R. E. Vinodhini, R. Archanaa, K. VimalKumar, “User specific product recommendation and rating system by performing sentiment analysis on product reviews”, 207 4th International Conference on Advanced Computing and Communication Systems (ICACCS), pp.1-5, 2017.