

## E-commerce Product Analysis Using Sentimental Analysis

P. Rathee

Department of Information Technology, MSIT, Janakpuri, Delhi, India

Author: [preetirathee09@gmail.com](mailto:preetirathee09@gmail.com)

DOI: <https://doi.org/10.26438/ijcse/v7i12.110114> | Available online at: [www.ijcseonline.org](http://www.ijcseonline.org)

Accepted: 20/Dec/2019, Published: 31/Dec/2019

**Abstract**— Electronic commerce is a way of trading in different types of products, gadgets and services. It offers a wide variety of people’s comments and opinions. Sentimental analysis also known as opinion mining is a method of understanding people’s attitudes, sentiments, feelings expressed in those written comments. This is an e-commerce web application tackles with sentence level sentimental analysis which fetches and classify the polarity of reviews as positive, negative and neutral. All those reviews are ranked based on this polarity that helps the user to make a smart choice among good, bad and worst products. This aims to reduce the time and effort of the user in searching for specific product on e-commerce website.

**Keywords**—Login, API, Rating System.

### I. INTRODUCTION

People in the developed and developing world now use e-commerce websites on a daily basis to make their everyday purchases [1]. There are number of social and e-commerce websites available like facebook, twitter, amazon, flipkart, myntra, in which different varieties of emotions and comments are written by the customers but we cannot classify and analyze these comments in the form of positive, negative and neutral impacts [2].

Sentiment is an attitude, thought, beliefs, views incited by feelings. Sentimental analysis studies people’s sentiments towards a particular entity. This entity can be any service, product, document, topic, event etc. It has gained much attention in recent years [3]. Its popularity is mainly due to two reasons. First, it has wide range of applications because sentiments are essential to all human activities and key influencers of our behaviors. Second, it presents many challenging research problems, which had never been attempted before the year 2000.

Sentimental analysis is also termed as opinion mining because it is a way to analyze the subjective information in the text and then mine the opinion. It can be applied at document, phrase or sentence extraction level. There are mainly three approaches for performing the sentimental analysis.

1. Lexicon Based: Involves a lexicon dictionary for identifying polarity of the text. [Purely Natural Language Processing (NLP) Based].

2. Machine Learning Based Approaches: Needs to develop a classification model, which is trained using pre-labeled dataset of positive, negative and neutral content. [Combines concept of NLP and Machine Learning (ML)].
3. Hybrid Approach: integrates the lexicon dictionary and pre-labeled data set for developing classification model. [Combines approach 1 and 2].

Now the question arises why do we need sentimental analysis? This paper defines our problem and solution for this.

Most of the E-Commerce websites have customer’s reviews listed below for each and every products, here comes reviews which includes rating out of 5 and a description which includes the customer opinion whether the product is bad or good, satisfactory etc. The overall outcome of a product comes with a star rating on scale of 5, it hides the main sentiments of the customer, however the true verdict of a product should be the true sentiments of the customer, so the problem arises that how we can show the sentiments of a customer?

Now here comes a solution for presenting the sentimental analysis of a customer for a true review of product. It can be implemented using “Natural Language Processing”[NLP]. By which we can extract the hidden words inside the review like not good, sober, ordinary etc, From which reviews can be given to these words in the form of numbers by this the need for giving stars a product can be discarded.

## II. RELATED WORK

In this paper[4] they proposed a novel approach for extracting the opinions on micro blogging service, Twitter where users post real time comments about everything. A hybrid approach using both corpus and dictionary based was developed. To find the semantic orientation of adjectives corpus method was utilized and to find the semantic orientation of verbs and adverbs dictionary method was utilized.

A web application which uses Naive Bayes classifier model to classify the messages and opinions in positive and negative form. This paper[2] specifies an algorithm that can accurately classify written messages with respect to a query term and according to average of message to generate a graph. Graph-based summary is presented after analyzing the messages.

This paper[3] handles a fundamental problem of sentimental analysis. They had selected the online reviews from Amazon.com as a data for the extraction of people's opinion. Different types of classifier models like Naïve Bayesian, Random Forest and Support Machine are applied for sentiment polarity categorization. Sentiment polarity categorization process has been proposed with detailed process descriptions.

Our paper presents a e-commerce web application using lexicon approach based on purely NLP in which reviews are collected in the form of static and dynamic to our database. The static reviews are posted by the users on our e-commerce web application and dynamic comments are fetched from the Amazon.com by using Amazon API. This allows to extract the high quality information and to uncover the hidden sentiments and opinions related to a particular product.

## III. SYSTEM ARCHITECTURE

Our project tackles with the sentence level sentimental analysis which fetches the reviews as data about the product from an e-commerce website and classify the polarity of reviews as positive, negative and neutral. This is an e-commerce web application where registered user can view and comment the reviews about the product. System will analyze the reviews with negative and positive weight in database and reviews are ranked based on this polarity that helps the user to specify whether the product is good, bad or worst for him.

- 1) The seller must need to register himself to add the products to our e-commerce website with details and specifications.

- 2) Customers are able to browse through the products added by the seller from which they can select a particular product to view its specifications, details, price, features and provide their comments about it.

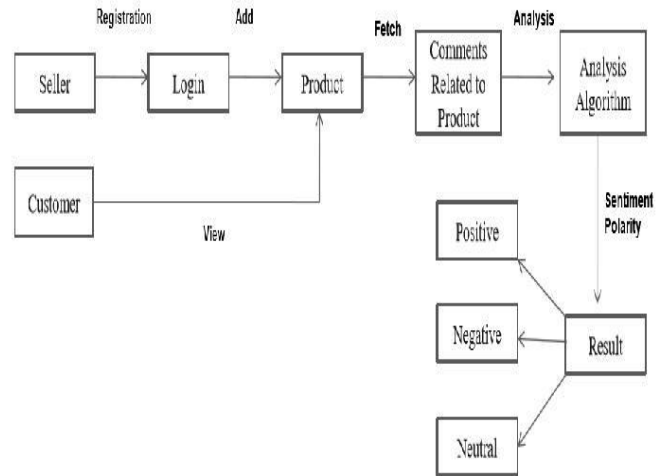


Figure 1. Block Diagram

- 3) Dynamic comments to a particular product are fetched from Amazon.com using Amazon API.
- 4) Both dynamic and static comments are collected to our database and analysis algorithm based on lexicon based approach is applied.
- 5) Result of analysis will classify the reviews as positive, negative and neutral.
- 6) Reviews are ranked based on this polarity that helps the user to make a smart choice among good, bad and worst products.

## IV. INTRODUCTORY PAGE

An introductory page of our e-commerce web application where a user can view the products by simply clicking on the "View All Our Products" button. This button will take the user to the products page where he can check out specifications, features and comments of all the distinct gadgets will be available to him.

## V. LOGIN PAGE

If a seller is already registered then he may simply click the "login" button and provide the necessary username and password and then click on "submit" button. The seller ID can be freely known and is visible when entered with a keyboard or other input device and the password must be secret. After clicking the submit button the seller will be authenticated to determine whether the user is who it claims to be and actually has permission to use the resources.



Figure 2. Login Page

## VI. SELLER PAGE

“Add new product” button allows sellers to add more products to our ecommerce website with detail specifications, features, price etc.

After clicking on this button will take the seller to our login/signup page where he can register himself. He can also add reviews about the products.

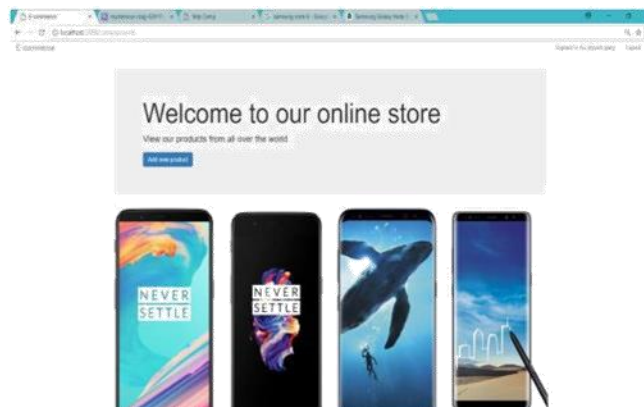


Figure 3. Seller Page

## VII. PRODUCTS PAGE

Any customer can check out our different gadgets which are added by the seller on our e-commerce website.

A “More Info” button allows our customers to know the product in detail for example specifications, features, price etc.



Figure 4. Product Page

## VIII. COMMENT PAGE

User can also add reviews to a particular product using “Add New Comment” Button .This is useful for the users who love to give reviews which will be added in the database.

Add new comments take the user to the login page where he will login/signup himself to give reviews. This allows only registered user to comment.



Figure 5. Comment Page

## IX. INTRODUCTION TO API

An API, or application programming interface, is a set of subroutine definitions, protocols, and tools for building application software. APIs make it easy to develop computer programs by providing the building blocks which are put together by the developer. By abstracting the underlying implementation, and only showing objects a developer needs, an API simplifies programming and development. While a GUI for an email client might provide the user with a button that performs all the steps to fetch and highlight new emails, an API for file I/O might give the developer an option that copies a file from one location to another without requiring the developer to understand the file system operations happening during this whole process. In fact, operating systems such as MS-Windows provide APIs that allow you to copy text from one place and paste it in another—it is the API that allows such an operation to work.

## X. HOW DOES OUR API WORK

- 1) Our API works on an ASIN number (Amazon Standard Identification number).
- 2) ASIN number is a 10 digit alphanumeric unique identifier stipulated by Amazon.com and its partners for product identification within the Amazon organization.
- 3) The same product can be entrusted by different ASIN number though which can be accessed by different national sites for the same product.

- 4) Each product added on our website has its own ASIN number.
- 5) Request for fetching the dynamic comments related a product from Amazon.com is fired to the Amazon server.
- 6) The Amazon server accepts the request and gives response as an object is received and processed to implement in our system.

## XI. ANALYSIS ALGORITHM

Our e-commerce web application is implemented by using lexicon approach based on purely Natural Language Processing(NLP). Lexicon Approach: considers a lexicon dictionary for identifying the polarity of the text. NLP is a field of computer science concerned with the interactions between computers and human languages.

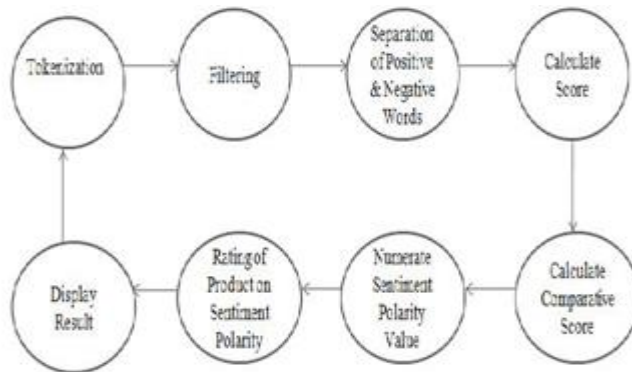


Figure 6. Work Flow

1. Tokenization: Splitting the lines of reviews and reduced to the list of words in the form of tokens.
2. Filtering: Removing unnecessary words that will not add value for sentimental analysis.
3. Separation: Identify positive and negative words from the extracted list of words.
4. Getting Score: Cross checking the string tokens(words) with the Afinn list and getting their scores. Afinn is a dictionary for valence with an integer between minus five(negative) and plus five(positive).
5. Comparative Score: Calculate comparative score by (Sum of each token/No of tokens).
6. Sentiment Polarity Value: Numerate sentiment polarity value by (Sum of all comparative scores/No of comments).
7. Rating Of Product: Reviews are ranked based on sentiment polarity value.

So let's take the following example:

I love cats, but I am allergic to them.

In this case love has a value of 3, allergic has a value of -2 according to the Afinn list of words and remaining token are

neutral with the value of 0. The resulting score and comparative score looks like:

$$\text{Score: } (3 + -2) = 1$$

$$\text{Comparative Score} = (3 + -2)/9 = 0.111111$$

```

{
  score: 1,
  comparative: 0.1111111111111111,
  tokens: [
    'I',
    'love',
    'cats',
    'but',
    'I',
    'am',
    'allergic',
    'to',
    'them'
  ],
  words: [
    'allergic',
    'love'
  ],
  positive: [
    'love'
  ],
  negative: [
    'allergic'
  ]
}
  
```

## XII. STAR RATING SYSTEM

On the basis of comparative scores we can compute sentiment polarity value by taking average of comparative scores. The reviews are ranked on the following basis: If sentiment polarity  $\geq 0.5$  (Assign 5 stars)

If sentiment polarity  $< 0.5$  &&  $> 0.3$  (Assign 4 stars)

If sentiment polarity  $< 0.3$  &&  $> 0.2$  (Assign 3 stars)

If sentiment polarity  $< 0.2$  &&  $> 0.1$  (Assign 2 stars)

If sentiment polarity  $< 0.1$  (Assign 1 star)

## XIII. COCNCCLUSION

We added different types of products like books, mobile phones etc and tested the implementation of analysis algorithm on both dynamic and static comments. The analysis algorithm worked accurately and helped users to understand their emotions, sentiments, feelings, attitude. E-commerce web application tackles with sentence level sentimental analysis which fetches and classify the polarity of reviews as positive, negative and neutral. All those reviews are ranked based on this polarity that helps the user to make a smart choice among good, bad and worst products.

## REFERENCES

- [1] S.Ullah, T.Alauddin, H. Zaman, "Developing an E-commerce website", Microelectronics, Computing and Communications (MicroCom), 2016 International Conference on 23-25 Jan. 2016
- [2] D. Jayvant, P. Sunita, "Product Review By Sentiment Analysis", International Journal Of Engineering And Computer Science

ISSN:2319-7242 Volume 3 Issue 5 may, Page No. 6202-6205  
**2014**

- [3] X. Fang , J. Zhan, “Sentiment analysis using product review data”,  
Journal of Big Data (2015) 2:5 DOI 10.1186/s40537-015-0015-2
- [4] A. Kumar,T.M.Sebastian, “Sentiment Analysis on Twitter”, IJCSI  
International Journal of Computer Science Issues, Vol. 9, Issue 4,  
No 3, July 2012 ISSN (Online): 1694-0814 .**2012**

### **Authors Profile**

*Ms. Preeti Rathee* completed her Masters in Technology (Computer Science and Engineering) from ITM University, India. She is currently pursuing Ph.D. from University School of Information, Communication and Technology, GGSIP University. She is currently working as Assistant Professor in Maharaja Surajmal Institute of Technology, GGSIP University. She has published few research papers in international conferences/journals of repute. Her main research interest focuses on Ontology and various Semantic Web concerns. research work focuses on Cryptography Algorithms, Network Security, Cloud Security and Privacy, Big Data Analytics, Data Mining, IoT and Computational Intelligence based education. He has 5 years of teaching experience and 4 years of Research Experience.