

**An E-Commerce platform built on
Service Quality Customer Care facility**

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Abstract: Customer feedback and ratings are now incorporated into the decision-making processes of e-commerce platforms. Additionally, it enhances businesses' ability to resolve issues during the purchasing process and provide superior service to customers by assisting them in better understanding their products. Negative customer reviews significantly enhance a business's ability to improve the overall quality of its products and services. This implies that product development will require considerable effort. Almost always, a customer's dissatisfaction with a product stems from issues they encountered after receiving it. After the warranty period has expired, customers expect to be able to repair their products. Customers frequently assume that the repair facility, which may include a service engineer, will be nearby. The primary issue is that no single location can provide all product services. When operating an online business, it is necessary to consider the company's customers. SERVQUAL recommends several enhancements to Indian E-Commerce, including pre-purchase product comparisons, an after-warranty product repair facility, and a helpdesk with real-time chat capabilities for resolving service issues for any brands within the existing E-Commerce structure based solely on customer reviews and ratings.

Keywords: E-Commerce, customer reviews, online ratings, SERVQUAL, Service Quality

1. Introduction

According to Sardar's third law of futures studies, the study of cultures' futures is always suspect. Due to the impossibility of implementing a single culture universally, no single culture will be able to endure into the future (Sardar, 2010). Diverse cultures in disparate locations result in disparate markets. It is critical for e-commerce businesses to conduct market research and then adapt their E-Commerce models to the existing market model (Ferguson, 2006).

Customers from other parts of the world are not comparable to Indian customers due to cultural differences in India. As a result, the Indian market requires a unique approach (Jadhav, 2020). India has surpassed the United States as the world's second largest market. India is the world's most populous country due to its youthful population. Due to the ease with which Indian youth accept E-Commerce, every online business assumes they will. Along with assisting consumers in making informed purchases, online reviews and ratings can be used to make recommendations to other customers (Gupta,2014). Both positive and negative customer feedback can benefit online businesses. This implies that product development will require considerable effort. Almost always, a customer's dissatisfaction with a product stems from issues they encountered after receiving it.

Customer satisfaction has been extensively studied in the context of e-commerce. According to Alalwan (2018), researchers used the TAM (Technology Acceptance Model) and TCA (Transaction Cost Analysis) to gain a better understanding of the investment-oriented approach required for a successful business implementation of new technology (Gefen, 2003). Establishing customer trust is critical for success in the new E-Commerce environment, and customer reviews play a critical role in establishing this trust (Gefen, 2003). In both studies (Asubonteng, 1996) and (Buttle, 1996), it was discovered that Service Quality (SERVQUAL) had an effect on customer satisfaction (Parasuraman, 1985).

After more than two decades, it's time to examine why Indian e-commerce companies continue to struggle for survival (Billewar,2012). Each business's success is inextricably linked to the calibre of its customer service.

2. The Systems in Use

Customers can check product ratings and reviews before making a purchase at two locations: Amazon and eBay.

2.1 Internet Reviews and Ratings

Customers can review details such as the following when they visit an e-commerce site such as Amazon:

2.1.1 Products and Services Recommendations

It is impossible to overstate the significance of online ratings. Customers' satisfaction ratings can be used to rank products online, with the most favourable ratings at the top and the least favourable ratings at the bottom. According to R. Filieri (2015), the lowest ratings indicate that the vendor's product quality or services are rife with risks and fraud (Clemons, 2006). Each e-commerce company has its own set of search algorithms. Amazon can keep track of the best price for each individual customer when they purchase something from the company using an algorithm known as A9. When a customer enters keywords, the algorithm gathers relevant data and then presents the customer with the "most suitable" options. Following that, the customer will examine the product's ratings.

2.1.2 Extensive Descriptions of Specific Features

The user then examines the product's specifications to ascertain its characteristics. The features are simply the specifics of the various product subparts and their associated specifications.

2.1.3 Reviews from Customers

The majority of online shoppers exercise extreme caution. They establish a link between online reviews and word-of-mouth recommendations and have an effect on a customer's final decision to purchase or not to purchase a product (Filieri R., 2015). Before making a purchase, the customer considers the number of reviewers and the comments left on the products. The positive reviews persuade him to purchase the product, while the negative reviews educate him about the product's shortcomings. The A9 algorithm ranks positive reviews and good sellers in ascending order based on their number.

2.1.4 Responses and comments from Customers

Customers can provide feedback and suggestions via the comment section, which also serves as a platform. The comment section enables businesses to ascertain what customers expect from their products and, more importantly, what service gaps exist. (1985, Parasuraman).

2.2 Product comparison websites.

There is another platform for product comparison, referred to in some circles as a price comparison website. These websites simply display the most common characteristics, such as price, technical specifications, and reviews, alongside one another. The customer makes comparisons between products based on insufficient details, and there is no guarantee that their opinions are genuine, as they may have been influenced by unethical behaviour (Cosma, 2016). (Source: Cosma, 2016). (2017) (Singh). However, these websites only provide a table of product characteristics, which cannot be considered a comparison unless and until users can determine whether or not the table is relevant to their product expectations.

3. Current System Issues

1 To be effective, an algorithm-based platform that transparently uses customer reviews and ratings to provide product comparisons and is uninfluenced by self-proclaimed experts is required.

2 The most serious issue is that there is currently no platform in place to assist customers in making the best product purchase possible based on their product expectations.

3 There is no system in place to evaluate negative customer feedback in order to meet their expectations and assist E-Commerce websites in resolving issues (Billewar, 2020).

4. Where can I obtain assistance if I am not a customer of the organisation in question but require modification of some system features or assistance in resolving a problem with the system? For instance: My laptop is running slowly... this indicates a need for additional RAM... There are, however, numerous businesses.

5 No platform exists in the same way that consultancies do.

6 The customer should be familiar with the technical specifications of the product in order to compare its features on a cost-effectiveness basis (Besterfield, 2019).

4. The existing System Gaps

Improving the current E-Commerce platform is a critical task that must be accomplished immediately. The SERVQUAL model aides in comprehending the business expectations of Indian customers (Parasuraman, 1988).

1. The existing system: To provide services, online reviews and ratings must be utilized.

The purpose of this study is to examine the relationship between the rating system and the demographics of customers as well as their perceptions of e-commerce retailers.

2. Gap 1: Product comparisons are a significant shortcoming of the system.

The purpose of this study is to determine the relationship between e-commerce appraisal activities and customer satisfaction without involving outside experts.

3. Gap 2: a customer service platform for all brands (Not Yet Available) (Not Available Currently)

To ascertain the breadth of the customer service platform's reach and the impact on customer loyalty.

4. Gap 3: A significant omission is the provision of repair services (Not Yet Available)

To ascertain the extent to which online retailers offer repair services and to develop novel solutions to major challenges

5. Proposed System Architecture

The paper proposes the following architecture, with a step-by-step approach illustrated in the diagram as a guide.

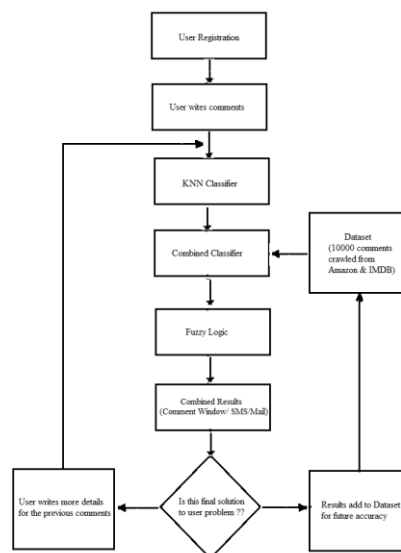


Figure 1: Proposed Block Diagram

5.1 Fetch the contents

Certain e-commerce companies permit crawling of their platforms' content, while others do not. Researchers are perpetually in need of data to conduct their research. Amazon aided the researchers in crawling a total of ten thousand customer reviews concurrently.

- i) The E-Commerce platform's customer reviews are crawled and analysed.
- ii) Users must complete a registration form with the bare minimum information required to comprehend his or her problem area.
- iii) Following that, the customer will be able to submit comments that will be matched against crawled data.

5.2 Knearest neighbour algorithm (KNN)

The k nearest neighbour algorithm (KNN) is a type of machine learning algorithm that is sometimes referred to as "lazy learning" due to the fact that, in comparison to other algorithms, it performs only partial computation until the function input is evaluated. It is necessary for the success of statistical techniques such as regression and classification. As a result, normalising or standardising training data can aid in increasing the data's accuracy. It provides answers to morally charged questions. As a result, clustering in data mining applications is relatively straightforward. This section can be used to categorise comments on specific products based on their features.

5.3 Naive Bayes classifiers

Naive Bayes classifiers are statistical algorithms that process, analyse, and categorise data when it comes to data processing and classification. When text analysts began their careers in the 1960s, Bayes classifiers were a frequently used text categorization tool. Filtering systems for email are used to receive and distinguish legitimate from spam emails.

The Nave Bayes Classification procedure is a simple and quick one. When Bayes' theorem is applied to a set of variables, Naive Bayes classification is a type of statistical model that does not require independent variables. These methods, when combined with density estimation techniques, have the potential to achieve higher levels of accuracy. The Nave Bayes algorithm is used for sentiment analysis.

Sentiment analysis is a technique for determining customer sentiments from statements or opinions expressed in online reviews and ranking systems such as Google. Sentiment analysis aides E-Commerce businesses and vendors in identifying and comprehending system flaws (Zhu., 2008).

$$\hat{P}(t_i|c_j) = \frac{1 + \text{number of times } t_i \text{ appears in a document from class } c_j}{d + \text{number of words in all documents from class } c_j}$$

$$\hat{P}(t_i|c_j) = \frac{\sum t f(t_i.d \in c_j) + \alpha}{\sum N_{d \in c_j} + \alpha.M}$$

It does this by identifying specific words, phrases, and chunks of statements about a particular subject and determining whether they convey positive, negative, or neutral feelings about a product or service."

5.4 Modified Max Entropy Classifier

The Maximum Entropy approach is frequently used for text classification, and it entails the use of weights for both feature selection and importance, as well as the selection of features and their relative importance, in order to improve text classification performance. Maximum Entropy classifiers frequently define more realistic boundaries than other methods of classification. We use Maximum Entropy modelling to ensure that all features are equally weighted and that less significant features are ignored (Deshmukh, 2018). The Chi-Square test and the Gini index are two frequently used statistical methods for population data analysis. Numerous circumstances necessitate the use of DIA and CMFS as well (Nurdiansyah, 2018).

The Chi-Square Test is defined as follows:

$$\text{CHI}(t_k.c_i) = \frac{N(a_{ki}d_{ki} - b_{ki}c_{ki})^2}{(a_{ki} + b_{ki})(a_{ki} + c_{ki}) + (b_{ki} + d_{ki})(c_{ki} + d_{ki})}$$

In this case, it is one of the most frequently used instruments for determining equality "and it is used to classify (Jain, 2016).

The Gini Index formula, which is also used for classification, is as follows:

$$\text{Gini}(S) = 1 - \sum_{i=1}^n \left(P(S_i/S) \right)^2$$

5.5 Combination of Classifier and Algorithm

In the field of text analysis, techniques such as Naive Bayes and maximum entropy classifiers are well-known. Both methods are effective because they are based on word counts. Recent research discovered that when single classifiers were compared to combinations of classifiers, the combined classifiers had a higher accuracy (Jain, 2016). (2017).

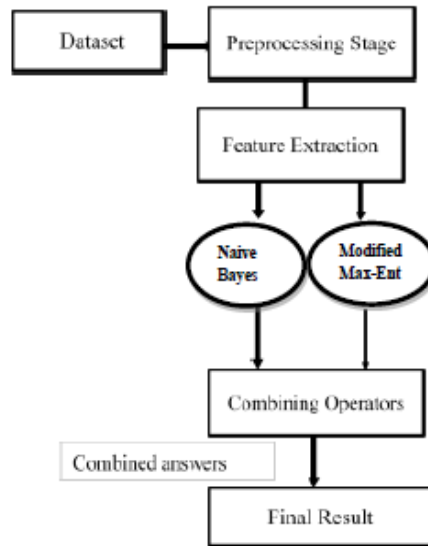


Figure 2: Combination of Classifier and Algorithm

The datasets are proposed to be read and used for preprocessing text data in preparation for further classification.

The following step will extract the pertinent features and use them to generate a list of processing keywords. The Global Feature Selection (GFS) method is used to determine similarities between the contents (Agnihotri, 2017). This method arranges the features in ascending order of importance and extracts the highest priority feature. When it comes to individual classification, both classifiers perform the task one-by-one. To enhance performance and minimise errors, the Modified Max Entropy Classifier is combined with a Nave Bayes classifier via three combination operators – Average (d), Max (d), and Harmonic Mean (d).

$$Average(d) = avg(NB(d).ME(d))$$

$$Max(d) = \max(NB(d).ME(d))$$

$$Harmonic(d) = \frac{(2.0 * NB(d) * ME(d))}{(NB(d) + ME(d))}$$

The Algorithm for Classification that was used to arrive at the final results

INPUTS: Preparation of the class C, documentation of the tests D, and data for training DR

OUTPUT: Enlarge class C for document d.

Step 1 is completed by utilising the Naive Bayes Algorithm for conditional probability and training with class labels as inputs.

Step 2: Calculate the probability of a class succeeding using the Nave Bayes Algorithm for each class in the dataset.

Step 3: Train a Modified Max Entropy Classifier by combining the Gini Index and the Chi-square weighting methods.

Step 4: For each successive class in the hierarchy, calculate the Modified Max Entropy Classifier.

Step 5: By combining the data for each class, compute the results.

Step 6: Determine the highest possible class and designate it as a class of d.

5.6 The Use of Fuzzy Logic

The term "fuzzy" refers to an ill-defined or misunderstood concept. When you live in the real world, you will frequently be unable to determine whether a belief is correct or incorrect. It is extremely beneficial if there are any inaccuracies.

The combination of multiple values is possible with fuzzy logic, which is based on a variable. Fuzzy logic's objective is to generate a large number of extremely accurate solutions. It is an engineering programme that utilises fuzzy logic to solve problems. When a computer is prompted to produce meaningful output, it must respond with TRUE or FALSE, which translates to "Yes" or "No." Management of a wide variety of systems is possible, from microcontrollers to large, networked, and powerful workstations (Jetter, 2014).

6. Training Time and Testing Time

ME To put it mildly, the classifier has a few flaws. The training and testing times are recorded to aid in the improvement of machine learning techniques, which aids in overcoming the time complexity inherent in the algorithm's learning process. To obtain the desired results, a variety of tests for various factors will be developed. Figure 2 illustrates a deviation of between 20 and 500, denoted by the letter K. The classifiers are designated as MEG, MEG, and MEC.

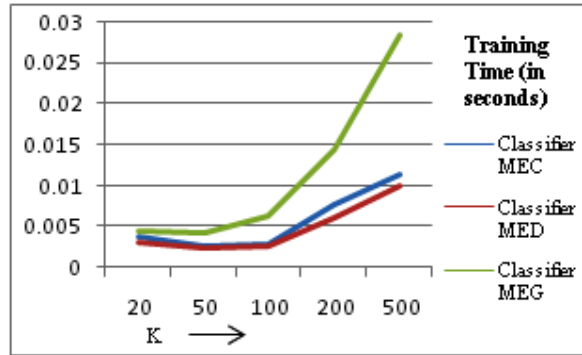


Fig. 7: Training Time

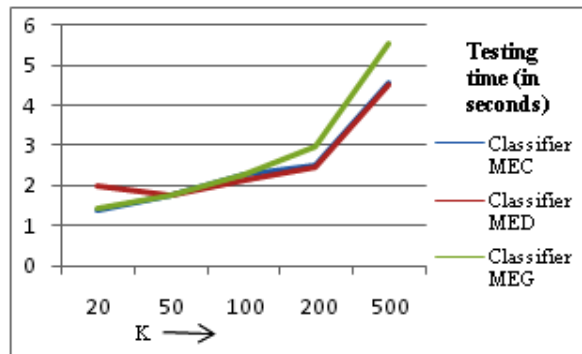


Fig. 8: Testing Time

In conclusion, the runtime growth is unrelated to the weighting features in the ME classifier, and the changes made to the ME classifier do not result in an increase in the classifier's complexity.

This study analysed a total of 252 battery-related reviews. A numerical value is assigned to the number of positive customer reviews for the service. Because the initial response is negative, they are labelled as 'No'. As an illustrative pie chart. According to a user sentiment analysis, approximately 69 percent of reviews are negative, with only 21% being positive.

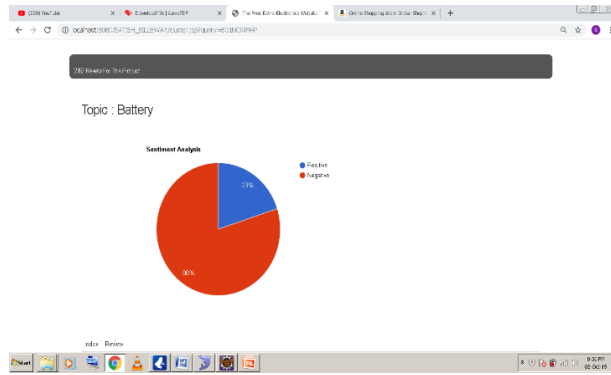


Figure 9: Sensitivity Analysis

The user will be able to make an informed decision about whether or not to purchase the product based on the user reviews.

In this case, the algorithm demonstrates that when applied to a different product, such as RAM, customer feedback is 100 percent accurate. Because users will be able to comprehend what clients desire, this product will have a profound effect on all clients.

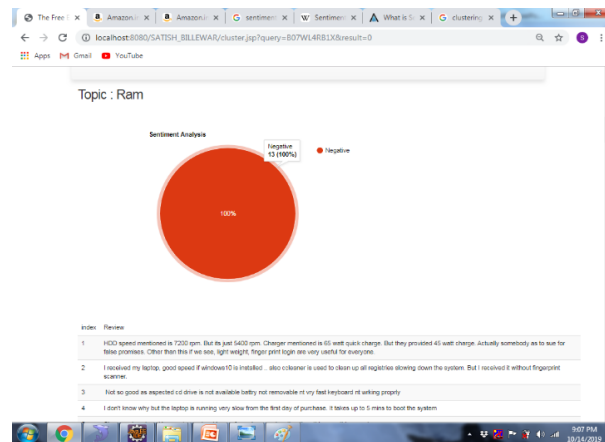


Figure 10: User Experience

7. Conclusion

Traditional markets have a number of advantages. For centuries, they have been extremely successful and stable in the Indian market. The SERVQUAL demonstrates that the online market should not be viewed as a threat to the traditional market structure, but as a modification of it. (1985, Parasuraman) Kurucu (2017).The e-commerce industry has enormous potential for transforming traditional brick-and-mortar businesses into online businesses. However, a distinction must be made between Indian customers and other types of customers worldwide.

Customers in India continue to have a psychological need to confirm the quality of a product during the purchasing process via the traditional offline method of personal assurance, which is still used today. There is no such thing as a faultless device in the world. We can only alter it if we accept it first and then attempt to alter it (Trist, 1980). Researchers have proposed a new generation of classification methods to safeguard E-Commerce businesses against malicious and harmful activity (Parasar, 2021). Change is an inescapable aspect of the natural world. Even at this point in time, there is still room for improvement (Pirages, 1994). No guarantee exists that the standard model provides the optimal framework for success in all global markets (Negrotti, 1984). The entire process can be used to evaluate a product's features for any prospective customer. A user should not be required to possess technical product knowledge in order to meet his or her technical requirements.

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