

# AN EFFICIENT REVIEW ON CUSTOMER REVIEWS FOR E-COMMERCE PORTAL USING MACHINE LEARNING TECHNIQUES

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**ABSTRACT:** Machine learning can understand computerized information at an a lot quicker rate than any human is able to do. Picking the application of machine learning will in general be a choice of needs. In a perfect world, we could pick everything, let the machines dominate, and unwind. In any case, this is woefully a long way from the real world. Organizations work with restricted assets and need to organize what machine learning technology to receive. It's protected to state that the need would be the tech that has the greatest effect. With this current, how about we review the most remarkable applications of machine learning technology in internet business. This present critical review paper is very useful to comprehend about the customer reviews for e-commerce portal utilizing the machine learning techniques.

**KEYWORDS:** machine learning, customer review, e-commerce, portal

## I. INTRODUCTION

Online business sites experience the ill effects of their customers. Face to face, a salesman connecting with a customer rapidly takes in what they are stating, their non-verbal communication, conduct, and numerous different elements so as to support the customer. Basically, the sales rep portions and targets, and customizes the customer's understanding to get them to purchase. When disconnected shoppers have an inquiry, concern, or dithering, a salesman is there to give them the correct data to bump them closer to buy. On the web, we experience difficulty understanding the immense measures of information should have been ready to give the equivalent custom fitted experience; which implies it's exceptionally hard to prod a going back and forth shopper closer to buy. This is the place machine learning has an effect. Machine learning technology makes it conceivable to give streamlined encounters that drive deals and increment income. Estimating is sufficiently basic. Be that as it may, today, with more information than any time in recent memory, internet business organizations are deciding to leave this errand to the machines. Not exclusively is machine learning ready to process information quicker, it's additionally ready to discover special bits of knowledge concealed where individuals weren't thinking to look. What's more, estimating is only a glimpse of something larger with regards to business insight. Machine learning can be applied to various scientific objectives. With more profound, more precise data, organizations can settle on information sponsored choices that at last lead to better items and administrations.

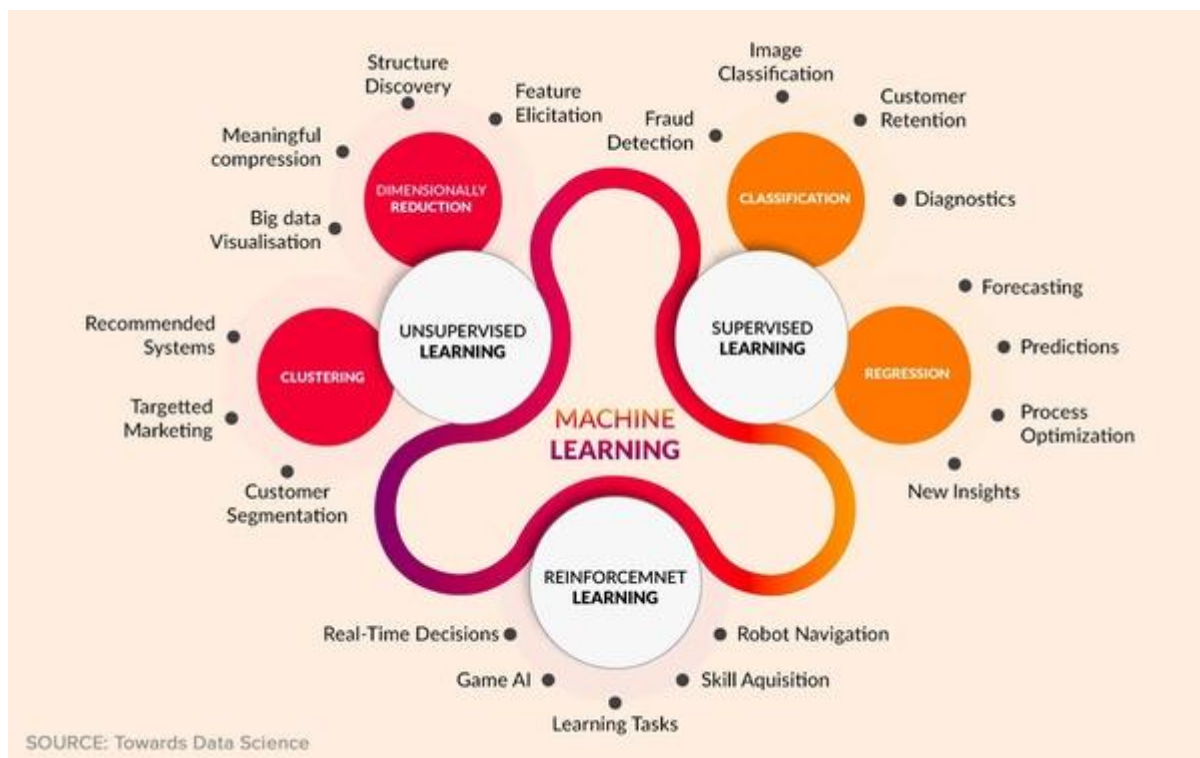


Figure 1: Core machine learning techniques for E-commerce

**E-commerce with machine learning applications**

E-commerce has developed significantly in the previous 10 years. More and more people are moving to web based purchasing since it is a lot simpler and financially savvy. Such an exponential increment in the quantity of exchanges, has prompted the accessibility of huge data sets (big data) which makes it simpler to run significant machine learning tests that work. Web based business organizations need to utilize machine learning to minimize expenses, be effective, offer customized customer encounters and remain in front of rivalry. Here are top 10 machine learning applications that are changing the manner in which we shop on the web.

♣ Personalized E-commerce search

Site search is the essential source of product discovery on any eCommerce site. Customers who search are 40% more likely to purchase than customers who don't. Google is the pioneer in utilizing machine learning in search results rankings. Regular language processing is used to understand complex search queries related to event, festivities, price and the sky is the limit from there. Metrics, for example, navigate rates, time spent on a product, expansion to truck, purchase data are used to personalize the search experience.

♣ Product recommendations

Product recommendations are used to up-sell and strategically pitch to a user taking a gander at a given product. They can have a direct effect on the revenue and profit edges. Machine learning can help in indicating personalized products to users based on their perusing patterns. ML techniques, for example, collaborative filtering, cosine similitude, Jaccard closeness are used in powering product recommendations.

♣ Chatbots

It is near to impossible to coordinate 2 billion users to 2 billion customer bolster agents. ML based chatbots can help in taking care of customer requests and answering their questions. ML chatbots learn from interacting with customers and evolve as more and more preparing data is tossed into them.

## ♣ Customer segmentation and targeting

Numerous eCommerce special activities, for example, email crusades, pop-up messages, promotion codes and more would require to create segments of the customer base for targeting. The more accurate these algorithms are at predicting user behavior, the better the performance of these battles and their ROI. Clustering ML algorithms, for example, K means, mean move clustering, expectation augmentation can help in this cause.

## ♣ Dynamic pricing

Evaluating is a huge deal on ecommerce sites. Finding the ideal price range keeping as a top priority the gracefully and demand for every given product in the inventory can't be scaled with people. Machine learning can perform great wonders here performing A/B tests to predict the ideal price point that matches customer expectations just as achieve business objectives.

## ♣ Demand sensing

Identifying the demand of a given product to the nearest decimal can help in the strategic team loading up products in ideal numbers which can result in huge reserve funds for e-commerce especially during huge sale days. ML algorithms can investigate past data and external full scale economic data to predict accurately the demand for products in inventory.

## ♣ Fraud detection

Machine learning can help in detecting fraudulent activities utilizing signs, for example, IP addresses, email address patterns, past exchange history and then some. This can address fraudulent activities, for example, utilizing stolen credit cards to purchase products in huge numbers, stolen account management or fraudsters who attempt to utilize the bugs in the eCommerce entrance software to place orders for free.

## ♣ Visual search

Image recognition algorithms can help in enabling users to take a photograph and search for a product. The ML algorithm identifies the image of the picture and matches it to products in the inventory. It can likewise help in powering product recommendations, for example, outwardly comparable products and furthermore automated product labeling and categorization.

## ♣ Sentiment Analysis

It is useful to comprehend what customers think about your eCommerce brand. Online networking, for example, Facebook, twitter are brimming with user comments about the experience they had with such retailers that can be used to derive meaningful bits of knowledge.

## ♣ Spam prevention

Product reviews and evaluations are a significant feature of eCommerce websites that can help in customers purchasing the correct product. Sometimes spammers could attempt to get false evaluations and reviews utilizing paid services and external service that use IP pivot. Machine learning can be effective in battling such spammers.

## II. LITERATURE REVIEW

Hendrik Scholta et.al [2020]. Implemented a cache system namely a one-stop shop to no-stop shop. The problem has been addressed as improving the arranging of structures to determine the single window contact in a one-stop shop, proactively starting the services without anyone else. To promote such action data has been viewed in three different dimensions as the joining of data gathering, consolidation of data storage, and the

objective of data usage. With this, the early-stage model has been extended further to receive services from government bodies. They proved the efficiency and effectiveness of the government services are improved with one-quit shopping. With the same three dimensional data, the model has been applied to provide rubbing free delivery of government services. They introduced the research challenges in exceptionally entrusting relationships among governments and citizens and government.

Atiqur Rahman et al. [2019] proposed that here, he has collected movie review data just as used five sorts of machine learning classifiers to analyze these data. Hence, the considered classifiers are Bernoulli Naïve Bayes (BNB), Decision Tree (DE), Support Vector Machine (SVM), Maximum Entropy (ME), just as Multinomial Naïve Bayes (MNB). Our examination outlines that MNB achieves better exactness, precision and F-score while SVM shows higher recall compared to others. Besides it additionally show that BNB Classifier achieves better exactness than previous experiment over this classifier.

Satuluri et al. [2018] proposed that the wide range of text data is getting generated as suggestions, feedbacks, tweets and comments. E-Commerce entryways are generating a ton of data every day as customer reviews. Breaking down 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 data from the customer reviews. Researchers have developed a great deal of techniques in Sentiment Analysis. For the most part sentiment Analysis is done utilizing a single machine learning algorithm. This work uses Amazon customer review data and focuses on discovering aspect terms from each review, identifying the Parts-of-Speech, applying grouping algorithms to discover the score of inspiration, negativity and neutrality of each review.

Ahmed Doha, Nada Elnahla et.al [2019] showed that the behavioral intention towards social commerce sites and behaviors that are most regularly done by the consumers. Based on the consumer behavioral pattern consumers can be attracted to social commerce fundamentally for the quest for social values. The addressed research model of the works has been using the three perspectives, for example, utilitarian, economic and social perspective. The obtained result of their work is propelling a social view, which is hedonic in nature and results affirm every one of the three perspectives. E.W.T. Ngai et.al [2009] conducted a survey on different applications of data mining methods specific to Customer Relationship Management i.e., CRM. It includes a series of procedures and encouraging systems endorsing an organization's arrangement to develop profitable and long haul relationships with certain customers. They addressed the research field of client retention and have received the most scientific examination at the center of attention. With the more discoveries of constraints over their survey, they concluded that strategy creators have to both keep up significant customers and improve the lifelong value of the client. Without anyone else, customer development and retention are both essential to furnishing a pleasant and longterm relationship with their clients.

D V Nagarjuna Devi et al. [2016] proposes a system that uses a supervised order approach called as help vector machine. This paper guarantees that the proposed classifier approach gives out the best result. It likewise identifies different challenges in sentiment examination like mockery and contingent sentences, linguistic errors, spam detection and anaphora resolution. sentence level order is done on input data which is further classified by the subjectivity/objectivity. Further aspect extraction is done utilizing SentiWordNet. This is then further fed to SVM classifier to locate the overall conclusion.

Shoiab Ahmed et al. [2015] proposes that the check of scored feeling words be classified into seven possible categories i.e. solid positive, positive, weak-positive, neutral, weak-negative, negative, solid negative. Sentiment investigation is then done with the help of these score tallies.

Venkata Rajeev P et al [2015] uses the reviews from flipkart.com and proposes the mix of four parameters: star appraisals of the product, the extremity of the review, age of review and helpfulness score, for determining the assessment of a product. The errand of mining the features is of specific importance and numerous methods are suggested for it. Weishu Hu et al. [2015] divides the sentiment investigation errands into three steps: identifying the feeling sentences and their extremity, mining the features that are commented upon by customers, and removing incorrect features.

The usage of twitter has kindled more research move in the direction of understanding the sentiments utilizing twitter data. One such work discussed in [Iqbal F et al (2019)] uses a crossover framework that uses a genetic algorithm-based way to deal with perform sentiment examination. The focal point of this work was to enhance the system from a versatility perspective. Creators of [Tan S et al (2014)] have explored the varieties of open sentiment over a given point utilizing a mathematical model to detect the foreground subjects and promote

effective positioning of candidates. An interesting business related to sentimental investigation is to arrange sentiment based on the subject of conversation. Creators of [Liu S, Cheng X, Li F, Li F (2015)] have provided an effective theme adaptive sentiment characterization over tweets. The different challenges posed while performing multiclass sentiment investigation has been discussed in [Bouazizi M, Ohtsuki T (2019)] and the creators have likewise developed a novel model that uses multiclass sentiment examination over twitter data.

Creators of [TrillaAn, Alias F (2013)] have proposed an effective text to speech conversion based on the sentences provided in twitter data. Creators of [Yu D, Xu D, Wang D, Ni Z (2019)] have introduced a novel method for hierarchical point modeling utilizing twitter data to perform Online Analytical Processing (OLAP).

TimurOsadchiy, Ivan Poliakov et.al. [2019] started their research work with a recommendation procedure based upon techniques like content-based and collaborative filtering. The application is taken to demonstrate their work on the food recommender system. They implemented recommender algorithms based upon an inherent social diagram, affiliation rule and dissecting pairwise affiliation. Their evaluation among these three methods the pairwise affiliation rules play superior on the specified dietary recall system. pairwise affiliation rules (PAR) suggest nourishments that are expected to be noticed with either of IF two by two. All through the preparation phase PAR for each noted food  $f$  calculates the number  $OD [ f ]$  of nourishments that include that food.

Oscar Araque et.al. [2019] applied deep learning techniques to do sentiment investigation in social applications. They applied their techniques to the movie review stage. It has been taken by six phases of work by them. At first, they were tried with the linear machine learning algorithm to create a deep learning-based sentiment classifier using a word embeddings worldview. The developed classifier capacities as a baseline to be compared to the accompanying results. Next to that, they worked on two ensemble methods which combined their baseline classifier with other side classifiers utilized extensively in Sentiment Analysis. By the third model, they worked out on two prototypes for which combines both the superficial and deep characteristics to combine data from multiple sources. As a fourth model, they establish a scientific categorization for categorizing the different models found in their literature. Fifth, they conducted multiple preliminaries to compare the accomplishment of those models with the deep learning norm. They analyzed the performance of the system by following the F1 measure technique.

### III. CONCLUSION

We reviewed the different types of customary recommender systems which are implemented to resolve several real-time application problems. Then, a survey and critique of recommender systems are provided as an outline. Based on the comparative investigation of different recommender systems with different applications, we can conclude with the problems and confinements faced by every consumer who are preferring to purchase things in online stores. In our examination, rundown of online customer reviews is defined as a process to transfer reviews from unstructured free texts to a structured or semi-structured synopsis which has extracted salient customer concerns over multiple reviews. The computerization of this process, in the context of e-Commerce and e-Business, ought to be able to help product designers to better understand the customer needs and to facilitate enterprise data management.

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