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A Comparative Performance Evaluation of Search Items and Experience Items in Amazon Customer Reviews

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Abstract

The accelerated growth of web users alongside developing the influence of online review web pages and social media has brought forth sentiment analysis assessment mining, which targets understanding what others think, assessments, comments and reviews about the item in social media, E-Commences sites, and so forth. The product review comments contributed by the customers have rich data about the use of the products. In this article, we have gathered reviews from Amazon.com by separating search items from experience items and we inspect the business effect of online reviews on product sales performance. This article looks at the impact of the degree of detail in an item review and the degree of analyst concurrence with it on the credibility of a review and customers' procurement expectations for search and experience items.

Keywords: product reviews, sentiment analysis, online reviews, search items, experience items

Introduction

Online client reviews have become today's informal exchange for the modern age customers and business supervisors. In modern times, E-business has expanded throughout the world, and these websites attract a large group of people for shopping products online [22]. Numerous web-based commerce platforms empower users to post online item reviews, individuals share their contemplations and encounters to initially know which items are prevalent and further which parts of these items are in best quality and lastly why they are good or bad [5,12,21,19]. Subsequently, large data in review columns is created which influence customers to pick the correct item. Moreover, these reviews contain assertive contents which can be valuable for the companies to identify the sections for improvement [5].

Data used in this article is a batch of product reviews gathered from Amazon.com between 07/03/2014 to 01/11/2019 for Burt's Bees and 02/03/2019 to 01/11/2019 for Apple iPhone 8 plus. The items are arranged into two groups of Search Items and Experience Items. Search items were listed as electronic devices, which are effectively comprehended through an online search before the customers' decision on purchasing the item. The best examples for Experience Items are as such: Health and Skin Care Items. The group is ascribed as a group that is hard to assess before one's purchase [4]. Types of items (i.e., Search Items and Experience Items) created and have been generally endorsed in the research conducted to examine customers' rational manner in taking the right/last decision to purchase the desired item [16]. Likewise, more detailed reviews contain more item descriptions and more insights regarding the procedure and the place the item was utilized in certain settings. However, an extended and long review does not necessarily contribute to its applicability. Long reviews can contain large irrelevant content, which debilitates the classification performance. This indicates that protracted reviews probably may not acquire more positive votes compared to reviews with shorter length.

Research Method

In this section, we would go through the methodology of the comparative performance evaluation of Search items and Experience items in Amazon customer reviews shown in this research as per given context. This involves the Sentiment Analysis, Sentiment Classification, Text Classification, Product Reviews, Dataset Description, Search Items and Experience Items.

Background of the Study

A. Sentiment Analysis

Sentiment analysis is a sort of data mining that assesses the tendency of individuals' ideas through natural language processing (NLP), computational phonetics and text analysis are utilized to extricate and analyze subjective data from the web, which are generally social media and analogous sources. The dissected data evaluates the general sentiments or responses toward specific items, individuals or thoughts and reveal the logical polarity of the same [1]. Sentiment analysis utilizes data mining procedures and methods to concentrate and collect data for analysis so as to observe the subjective assessment of a document or group of archives, similar to reviews, blog posts, news stories and social media channels like tweets and status updates. Sentiment analysis is the act of applying natural language processing and text investigation strategies to distinguish and separate select information from text [2].

Sentiment analysis of natural language texts is a broad and expanding area. Opinion Mining or Sentiment Analysis is a computed analysis of ideas, perspectives and sentiment of text [1]. Sentiment Analysis is a Natural Language Processing and Information Extraction task which is expected to measure a client's sentiments that is communicated either in a positive or negative remarks and attitude as well as inquiries and demands. The process is through-analyzing large quantities of reports on the web .Changing a part of the textual content to a component part which is a major step in any information-driven method to deal with Sentiment Analysis [18].

B. Sentiment Classification

Once the most comparable features are found, each review is put into groups of Positive and Negative utilizing user evaluations. From the scale of 1 to 5 every review has been rated reciprocally. Before anything else, we shall apply our trials on a balanced dataset. As a result, a balanced dataset was given after discarding each and every review with the rating of 3 [7]. Followed by this step, we shall report our experiments on an unbalanced dataset. Now, we shall consider every review and rating over 2 as a positive assessment. For example, every rating above 3 is considered as +1 whereas anything below 3 falls under the group of -1 review.

C. Text Classification

The text classification techniques utilizing the ML approach potentially can divide into two groups of unsupervised and supervised learning techniques. The techniques that are unsupervised utilize a large number of marked training documents. The unsupervised techniques are utilized when it is hard to locate these marked training documents [3,6,7,22].

D. Product Reviews

Online item reviews are electronic verbal composed by shoppers on the Internet. They have become the most significant type of electronic verbal. Most online customers depend vigorously on online item reviews

to settle on the purchase options. This type of electronic verbal, however, presents new difficulties for customers. Different from the verbal face to face contact, online item reviews contain textual and graphical components that customer's reviews to decide the reliability of the reviews. Machine learning and data mining techniques distinguish designs from a lot of data using factual and heuristics strategies. These strategies were applied to many areas, such as: Business Stakeholder Classification [23], Crime Analysis [24], and Medical Data Forecast. Data mining methods and techniques are applied through text mining in analyzing unstructured data, further substances are extracted through data and text mining strategies by web mining and text data.

The above strategies have been applied to a wide range of online Item Review Analyses. For instance, effect on offers of web-based games and the findings explained these reviews were increasingly persuasive for not very much popular games and those games whose players are more expert on internet techniques that were based on dictionary depicted reviews textual features as well as utilizing the procedures which are machine learned. Lexical comparability, shallow syntactic highlights, and lexical subjectivity (are) pieces of evidence to apply on futile reviews. To address uncertainty in Text Reviews, phonetic principles (should be applied) to study the semantic directions of words in the reviews given by customers [10, 13].

To help with the spam reviews, reviews were also grouped into False Suppositions (remarks that are either negative or positive), Brand Reviews which are mainly subjected to the brand of the product rather than the type of the product itself and non-reviews are those ads which did not include any comment. Furthermore, the product proposal has been done by mapping every sentence of each review into a manually-made ontology. As an instance, many movie characters were considered to be excluded from the list of viewers who can actually review movies using WordNet and Statistical Analysis.

Dataset Description

Amazon.com has been considered as the data source of Online Product Reviews (OPRs). Being the biggest web-based business platform in the world, Amazon.com offers a wide range of commodities as well as a good number of OPRs which are easily accessed for analysis. After presenting a developed framework's applicability on one item alone from Amazon, it can also be applied to many other different items as well. Reviews put on the Amazon.com carry valuable information, naming: reviewer's identity, commentator's validity, item's rating, date of review, conduciveness as rated by other people who had reviewed the items and the capacity to alter edit at any given time. Besides this good amount of data, Amazon's method of empowering customer's reaction and reviews guarantees that the database is both a good and reliable data source. This is manifested by the "Hall of Fame" on Amazon.com, a web page announcing those clients that helped the most.

I. Search Items

The items are characterized into Search items and Experience items. Search items, for example, electronics, have traits which are effectively comprehended through an online search before buy. For Search items, buyers consider online reviews to be more reliable when the reviews contain definite data about the product [4]. This pretest is meant to affirm whether the items utilized in our experiment are viewed as either Search or Experience items. This step is conducted in the light of the fact that earlier research suggests an irregularity in item classifications. For example, a digital camera is viewed as a Search Item in certain investigations yet an Experience Item in others [4]. To conclude our research work, we tend to take two items from the given groups in our research. We then have followed the following progress: First, we distinguished the items considered as either a Search Item or an Experience Item through a review of the current literature. In the step followed, we picked the items that were regularly and widely purchased, which is, iPhone 8 with 64 GB storage memory and iPhone 8 with 256 GB ROM as our Search Items and

Burt's Bees 100% Natural Moisturizing Lip Balm, Super organic products such as: Pink Grapefruit, Mango, Coconut, Pear and Pomegranate as our Experience Items.

Table I Stars, Reviews and number of sentences used in each review- IPhone8 Plus

IPhone8 Plus	Total Number of Reviews	Total Number of sentences
*	143	617
**	30	137
***	49	250
****	113	509
*****	644	3991

Figure 1 Customer Ratings on Iphone8 Plus

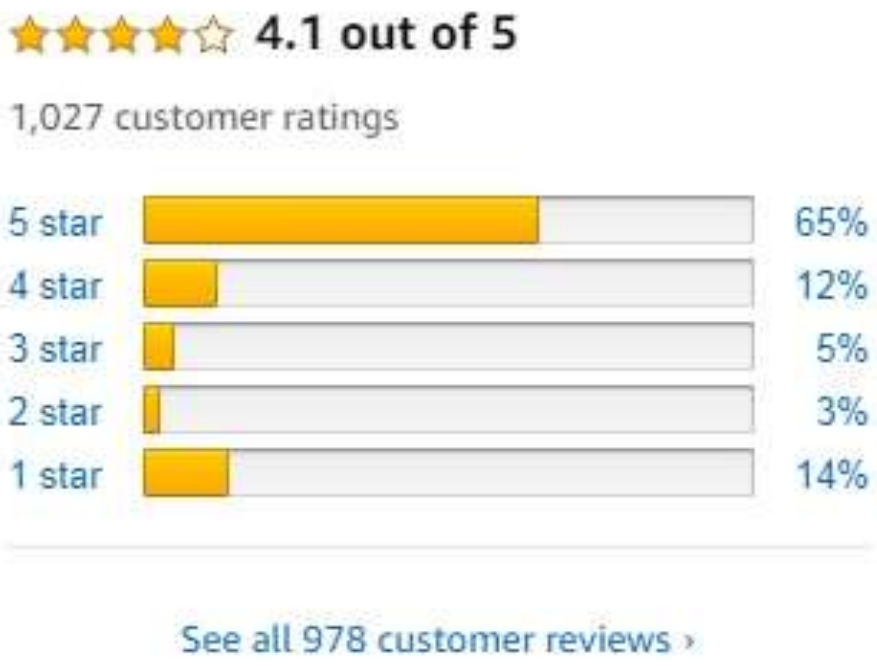
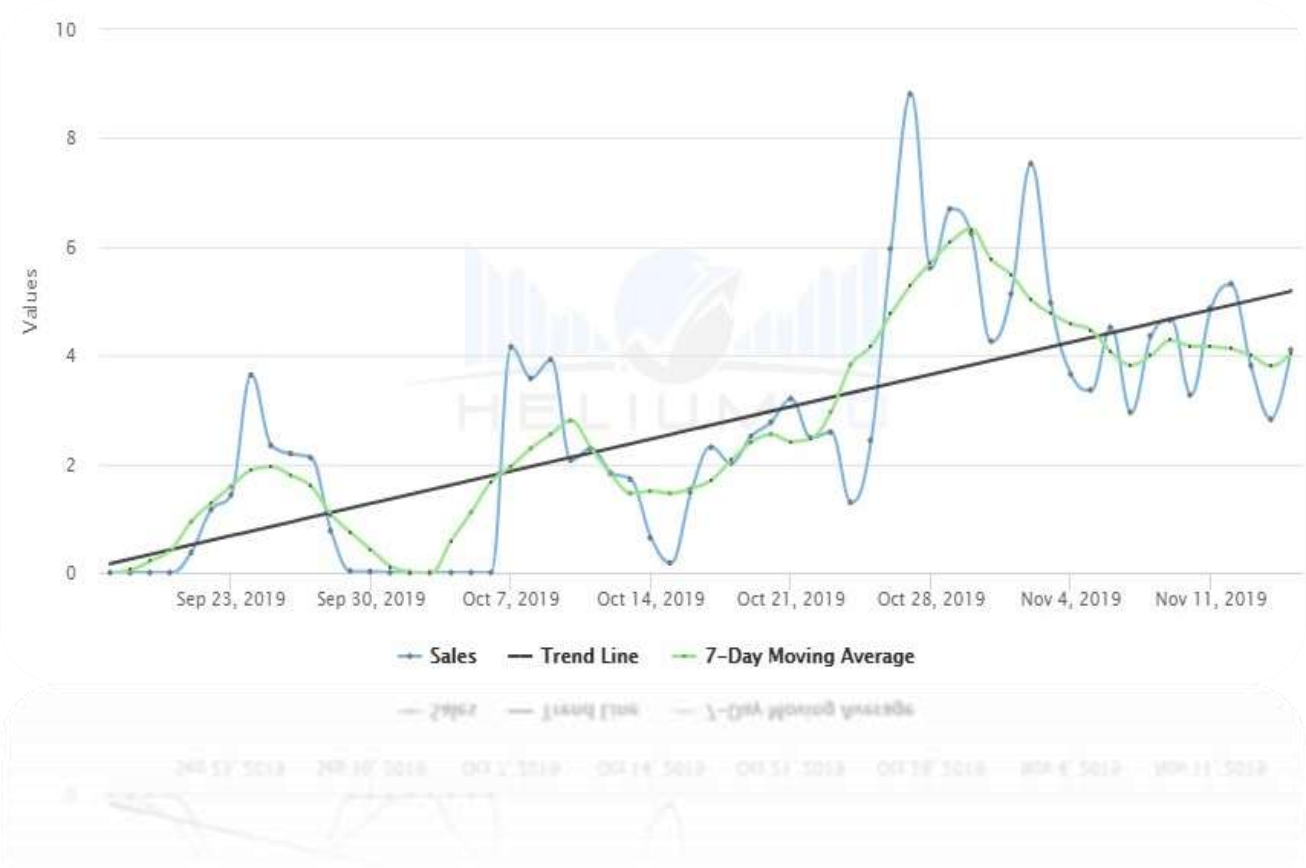


Figure 2 Sales Chart Apple iPhone 8 Plus, GSM Unlocked, 256GB - Silver (Renewed)



II. Experience Items

For Experience items, customers decide the validity of a review by evaluating the degree of reviewer concurrence with a review. Experience items, for example, skincare items, have ascribes that are hard to assess before making an order [4, 9, 17].

Table II Stars, Reviews and number of sentences used in each review -Burt's Bee

Burt's Bee	Total Number of reviews	Total Number of sentences
*	156	704
**	89	248
***	161	490
****	304	937
*****	3755	9729

Figure 3 Customer Ratings on Burt's Bee

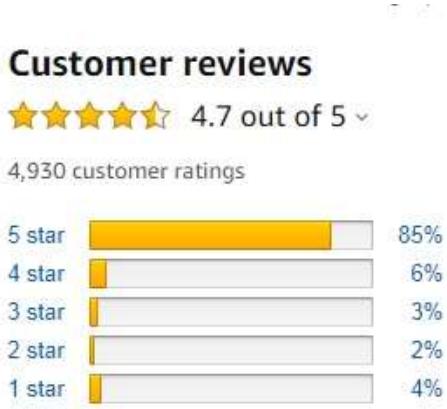
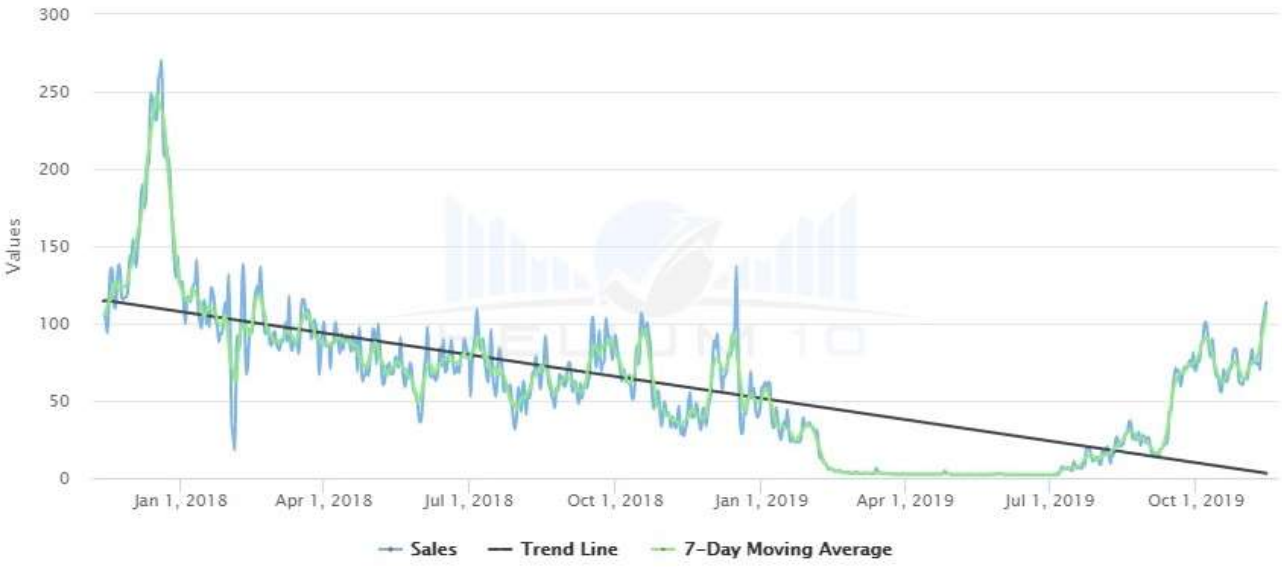


Figure 4 Sales Chart Burt's Bees 100% Natural Moisturizing Lip Balm, Pomegranate with Beeswax and Fruit Extracts - 4 Tubes



According to the analysis shown earlier in this paper, the reviews written on Search items have a more significant impact on the customers than reviews on the Experience items. The review written on the Search item is more acceptable and convinces the customer to buy the desired product faster.

Table III Comparison of Burt's Bee with IPhone 8 Plus

Numbers / Name	Total number of review	Total number of sentences	Total number of positive review	Total number of negative review
Burt's Bee	4465	12108	4220	245
IPhone 8 Plus	979	5504	806	173

Note that all items include a heap of look and experience characteristics. A customer may have a generally simpler time assessing a Search item since it has clear attribute information, while for an Experience item,

keeping in mind its ambiguous characteristics, overall execution-related information is more appropriate for shopper assessment [8,11,20]. That is the point at which a purchaser assesses an experience item, understanding the quality of the item through the presentation of its features and overall performance compared with the assessment of a search item is quite more difficult [14]. This result is compatible with the meaning of search and experience items, which proposes that a buyer will think of it as moderately hard to survey an Experience item before experiencing it himself/herself, compared with a Search item [4 ,15].

Conclusion

From the perspective of customer review, this paper presented several challenges related to Search items and Experience items. Besides, we also described a part of performance evaluation of Amazon customer reviews, compared with Search items and Experience items. According to the analysis, the reviews written on Search items have a more significant impact on the customers than reviews on the Experience items. Also, this paper will assist the researchers in understanding the concept of search items, experience items and the customer review impact on them. It also helps them to design and build novel business customer reviews based on analytical models for the analytics of business selected data. This article looks at the impact of the degree of detail in an item review and the degree of analyst concurrence with it on the credibility of a review and customers' procurement expectations for search and experience items. In this paper, the proposed approach is the development of business intelligence, impacts of customer review on search items and experience items.

References

1. Watkins, J., Fabielli, M., & Mahmud, M. (2020, July). Sense: a student performance quantifier using sentiment analysis. In 2020 International Joint Conference on Neural Networks (IJCNN) (pp. 1-6). IEEE.
2. Naseem, U., Razzak, I., Musial, K., & Imran, M. (2020). Transformer based deep intelligent contextual embedding for twitter sentiment analysis. Future Generation Computer Systems, 113, 58-69.
3. Chen, D., Zhang, D., & Liu, A. (2019). Intelligent Kano classification of product features based on customer reviews. CIRP Annals, 68(1), 149-152.
4. Sun, X., Han, M., & Feng, J. (2019). Helpfulness of online reviews: Examining review informativeness and classification thresholds by search products and experience products. Decision Support Systems, 124, 113099.
5. Tang, F., Fu, L., Yao, B., & Xu, W. (2019). Aspect based fine-grained sentiment analysis for online reviews. Information Sciences, 488, 190-204.
6. Li, X., Wu, C., & Mai, F. (2019). The effect of online reviews on product sales: A joint sentiment-topic analysis. Information & Management, 56(2), 172-184.
7. Bansal, B., & Srivastava, S. (2018). Sentiment classification of online consumer reviews using word vector representations. Procedia computer science, 132, 1147-1153.
8. Ireland, R., & Liu, A. (2018). Application of data analytics for product design: Sentiment analysis of online product reviews. CIRP Journal of Manufacturing Science and Technology, 23, 128-144.
9. Kamalapurkar, D., Bagwe, N., Harikrishnan, R., Shahane, S., &Gahirwal, M. (2017). Sentiment analysis of product reviews. Int. J. Eng. Sci. Res. Technol, 6(1), 456-460.
10. Gui, L., Zhou, Y., Xu, R., He, Y., & Lu, Q. (2017). Learning representations from heterogeneous network for sentiment classification of product reviews. Knowledge-Based Systems, 124, 34-45.

11. Singh, R., Gill, J. S., Sharma, T., &Goel, G. (2016). Product Aspect Ranking, Sentiment Analysis and Classification of Product Reviews on E-Commerce Sites-A Review. Journal of Network Communications and Emerging Technologies, 6(5).
12. Singh, J. P., Irani, S., Rana, N. P., Dwivedi, Y. K., Saumya, S., & Roy, P. K. (2017). Predicting the "helpfulness" of online consumer reviews. Journal of Business Research, 70, 346-355.
13. Hussein, D. M. E. D. M. (2018). A survey on sentiment analysis challenges. Journal of King Saud University-Engineering Sciences, 30(4), 330-338.
14. Salehan, M., & Kim, D. J. (2016). Predicting the performance of online consumer reviews: A sentiment mining approach to big data analytics. Decision Support Systems, 81, 30-40.
15. Khan, F. H., Qamar, U., & Bashir, S. (2016). eSAP: A decision support framework for enhanced sentiment analysis and polarity classification. Information Sciences, 367, 862-873.
16. Bhatt, A., Patel, A., Chheda, H., &Gawande, K. (2015). Amazon review classification and sentiment analysis. International Journal of Computer Science and Information Technologies, 6(6), 5107-5110.
17. Asghar, M. Z., Khan, A., Ahmad, S., &Kundi, F. M. (2014). A review of feature extraction in sentiment analysis. Journal of Basic and Applied Scientific Research, 4(3), 181-186.
18. Vinodhini, G., &Chandrasekaran, R. M. (2016). A comparative performance evaluation of neural network based approach for sentiment classification of online reviews. Journal of King Saud University-Computer and Information Sciences, 28(1), 2-12.
19. Huang, L., Tan, C. H., Ke, W., & Wei, K. K. (2014). Do we order product review information display? How?. Information & management, 51(7), 883-894.
20. Htay, S. S., & Lynn, K. T. (2013). Extracting product features and opinion words using pattern knowledge in customer reviews. The Scientific World Journal, 2013.
21. Chung, W., & Tseng, T. L. B. (2012). Discovering business intelligence from online product reviews: A rule-induction framework. Expert systems with applications, 39(15), 11870-11879.
22. Dang, Y., Zhang, Y., & Chen, H. (2009). A lexicon-enhanced method for sentiment classification: An experiment on online product reviews. IEEE Intelligent Systems, 25(4), 46-53.
23. Chung, W., Chen, H., & Reid, E. (2009). Business stakeholder analyzer: An experiment of classifying stakeholders on the Web. Journal of the American Society for Information science and Technology, 60(1), 59-74.
24. Chen, H., Chung, W., Xu, J. J., Wang, G., Qin, Y., & Chau, M. (2004). Crime data mining: a general framework and some examples. computer, 37(4), 50-56..