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Application of Support Vector Machine and Convolutional Neural Network for Sentence-Level Sentiment Analysis of Companies Products Review

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Abstract

The longevity of any company's sustainability is largely dependent on its' capability to satisfy customers' needs. Hence, many industrial analysts and researchers have acknowledged the impact of customers' reviews, which is the most common approach and tool used to ascertain the level of satisfaction or dissatisfaction of. To determine the sentiment polarity and classification of product reviews, several authors have employed different tools with varying degrees of accuracy when compared to other models. In this study, a hybridized CNN-SVM algorithm model was developed for sentence-level sentiment analysis on musical products reviews on Amazon. A total of 44,463 training samples and 19,056 samples were used for testing and validating the model. Based on the performance metric of the hybrid models, CNN had an accuracy of 85.38%, a precision of 90.56%, a recall of 95.14%, and an AUC of 0.836, whereas, SVM had an accuracy of 85.74%, a precision of 85.62%, a recall of 100%, and an AUC of 0.5. It was observed that there are more positive sentiments and satisfaction obtained from these products as against the negative sentiments. Hence, the level of satisfaction on these products reflected on the analyzed sentiments.

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References

1. Kang M, Choi Y, Choi J (2019) The effect of celebrity endorsement on sustainable firm value: evidence from the Korean telecommunications industry. *Int J Advert* 2019(38):563–576

[Article Google Scholar](#)

2. Rajesh KP, Pandiaraja P (2019) An efficient sentiment analysis approach for product review using Turney algorithm. In: International conference on recent trends in advanced computing 2019, ICRTAC 2019. *Procedia Comput Sci* 165:356–362

[Google Scholar](#)

3. Andrea E, Sebastiani F (2012) Determining the semantic orientation of terms through gloss classification. In: Proceedings of the 14th ACM international conference on information and knowledge management (CIKM 2005), Bremen, DE, pp 617–624

[Google Scholar](#)

4. Fan Z, Xi Y, Li Y (2018) Supporting the purchase decisions of consumers: a comprehensive method for selecting desirable online products. *Kybernetes* 2018(47):689–715

[Article Google Scholar](#)

5. Gandomi A, Haider M (2015) Beyond the hype: big data concepts, methods, and analytics. *Int J Inf Manag* 2015(35):137–144

[Article Google Scholar](#)

6. Pooja M, Pandya S (2020) A review on sentiment analysis methodologies, practices and applications. *Int J Sci Technol Res* 9(2). ISSN 2277-8616

[Google Scholar](#)

7. Sailunaz K, Alhadj R (2018) Emotion and sentiment analysis from twitter text. J Comput Sci 36(101003):1–18

[Google Scholar](#)

8. Jagdale RS, Shirsat VS, Deshmukh SN (2019) Sentiment analysis on product reviews using machine learning techniques. In: Cognitive informatics and soft computing. Adv Intell Syst Comput 768. https://doi.org/10.1007/978-981-13-0617-4_61
9. Ashima Y, Vishwakarm DK (2020) A deep language-independent network to analyze the impact of COVID-19 on the world via sentiment analysis

[Google Scholar](#)

10. Erick K, Peral J, Gil D, Ferrández A, Sellers R, Mora H (2019) Managing marketing decision-making with sentiment analysis: an evaluation of the main product features using text data mining. Sustainability 11:4235. <https://doi.org/10.3390/su11154235>
11. Najma S, Kumar P, Patra MR, Chandra S, Safikul Alam SK (2019) Sentiment analysis for product review. ICTACT J Soft Comput 9(3). ISSN 2229-6956 (Online). <https://doi.org/10.21917/ljisc.2019.0266>
12. Dishi J, Vardhan BH, Kandasamy SK (2019) Sentiment analysis of product reviews—a survey. Int J Sci Technol Res 8(12). ISSN 2277-8616

[Google Scholar](#)

13. Naz S, Sharan A, Malik N (2018, December) Sentiment classification on Twitter data using support vector machine. In: 2018 IEEE/WIC/ACM international conference on web intelligence (WI). IEEE, pp 676–679

[Google Scholar](#)

14. Kalchbrenner N, Grefenstette E, Blunsom P (2014) A convolutional neural network for modelling sentences. arXiv preprint [arXiv:1404.2188](https://arxiv.org/abs/1404.2188)
15. Konstantinos K (2018) Sentiment analysis for Tweets. Athens University of Economics and Business

[Google Scholar](#)

16. Araújo M, Pereira A, Benevenuto F (2020) A comparative study of machine translation for multilingual sentence-level sentiment analysis. *Inf Sci* 512:1078–1102

[Article Google Scholar](#)

17. Pang B, Lee L, Vaithyanathan S (2002) Thumbs up? Sentiment classification using machine learning techniques. In: Proceedings of the 2002 conference on empirical methods in natural language processing (EMNLP), Philadelphia, PA, USA, July 2002, pp 79–86

[Google Scholar](#)

18. Takamura H, Inui T, Okumura M (2007) Extracting semantic orientations of phrases from dictionary. In: Proceedings of human language technologies: the annual conference of the north American chapter of the ACL, pp 292–299

[Google Scholar](#)

19. Turney PD (2002) Thumbs up or thumbs down? Semantic orientation applied to unsupervised classification of reviews. In: Proceedings of the 40th annual meeting on association for computational linguistics. Association for computational linguistics

[Google Scholar](#)

20. Zhang C, Zeng D, Li J, Wang F-Y, Zuo W (2009) Sentiment analysis of Chinese documents: from sentence to document level. *J Am Soc Inform Sci Technol* 60(12):2474–2487

[Google Scholar](#)

21. Aljuhani SA, Alghamdi NS (2019) A comparison of sentiment analysis methods on Amazon reviews of mobile phones. *Int J Adv Comput Sci Appl* 10(6):608–617

[Google Scholar](#)

22. Arun M, Prabhakar TV (2007) Sentence level sentiment analysis in the presence of conjuncts using linguistic analysis. In: ECIR 2007, LNCS vol 4425, pp 573–580

[Google Scholar](#)

23. Hu M, Liu B (2004) Mining and summarizing customer reviews. In: Proceedings of the tenth ACM SIGKDD international conference on knowledge discovery and data mining. ACM

[Google Scholar](#)

24. Jagtap VS, Pawar K (2013) Analysis of different approaches to sentence-level sentiment Classification. Int J Sci Eng Technol 2(3):164–170. ISSN 2277-1581

[Google Scholar](#)

25. Donatas M, Frasinca F (2020). ALDONAr: a hybrid solution for sentence-level aspect-based sentiment analysis using a lexicalized domain ontology and a regularized neural attention model. Inform Process Manage 57:102211

[Google Scholar](#)

26. Fang X, Zhan J (2015) Sentiment analysis using product review data. J Big Data 2(1):5

[Google Scholar](#)

27. Tian F et al (2015) A topic sentence-based instance transfer method for imbalanced sentiment classification of Chinese product reviews. Electron Comm Res Appl. <https://doi.org/10.1016/j.elerap.2015.10.003>

28. Gui L, Zhou Y, Xu R, He Y, Lu Q (2017) Learning representations from heterogeneous network for sentiment classification of product reviews. Knowl-Based Syst 124:34–45

[Article Google Scholar](#)

29. Raheesa S, Sharmila KR, ShriSubangi TS, Vimal EA (2017) Sentiment analysis on online product review. Int Res J Eng Technol (IRJET) 4(4). e-ISSN 2395-0056

[Google Scholar](#)

30. Kim Y (2014) Convolutional neural networks for sentence classification. In: Conference on empirical methods in natural language processing, Doha, Qatar, pp 1746–1751

[Google Scholar](#)

31. Johnson R, Zhang T (2017, July) Deep pyramid convolutional neural networks for text categorization. In: Proceedings of the 55th annual meeting of the association for computational linguistics, vol 1: Long Papers. pp 562–570

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