

REFERENCES

- [1] V. H. Pranatawijaya, N. N. K. Sari, R. A. Rahman, E. Christian, and S. Geges, "Unveiling user sentiment: Aspect-Based analysis and topic modeling of Ride-Hailing and Google Play app reviews," *Journal of Information Systems Engineering and Business Intelligence*, vol. 10, no. 3, pp. 328–339, Oct. 2024, doi: 10.20473/jisebi.10.3.328-339.
- [2] P. H. C. Samanmali and R. a. H. M. Rupasingha, "Sentiment analysis on google play store app users' reviews based on deep learning approach," *Multimedia Tools and Applications*, vol. 83, no. 36, pp. 84425–84453, Apr. 2024, doi: 10.1007/s11042-024-19185-w.
- [3] A. S. Chan, F. Fachrizal, and A. R. Lubis, "Outcome prediction using Naïve Bayes algorithm in the selection of role Hero Mobile Legend," *Journal of Physics Conference Series*, vol. 1566, no. 1, p. 012041, Jun. 2020, doi: 10.1088/1742-6596/1566/1/012041.
- [4] Y. Chandra and A. Jana, "Sentiment Analysis using Machine Learning and Deep Learning," *2022 9th International Conference on Computing for Sustainable Global Development (INDIACom)*, Mar. 2020, doi: 10.23919/indiacom49435.2020.9083703.
- [5] A. Yadav and D. K. Vishwakarma, "Sentiment analysis using deep learning architectures: a review," *Artificial Intelligence Review*, vol. 53, no. 6, pp. 4335–4385, Dec. 2019, doi: 10.1007/s10462-019-09794-5.
- [6] M. Sivakumar and S. R. Uyyala, "Aspect-based sentiment analysis of mobile phone reviews using LSTM and fuzzy logic," *International Journal of Data Science and Analytics*, vol. 12, no. 4, pp. 355–367, 2021, doi: 10.1007/s41060-021-00277-x.
- [7] S. A. Thampy and J. J. R. Angelina, "Deep Learning Architectures Based Sentiment Analysis Systematic Literature Review," *2023 International Conference on Control, Communication and Computing (ICCC)*, May 2023, doi: 10.1109/iccc57789.2023.10164943.
- [8] N. M. A. Raihan and N. E. B. Setiawan, "Aspect Based Sentiment Analysis with FastText Feature Expansion and Support Vector Machine Method on Twitter," *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, vol. 6, no. 4, pp. 591–598, Aug. 2022, doi: 10.29207/resti.v6i4.4187.
- [9] H. Mohaouchane, A. Mourhir and N. S. Nikolov, "Detecting Offensive Language on Arabic Social Media Using Deep Learning," *2019 Sixth International Conference on Social Networks Analysis, Management and Security (SNAMS)*, 2019, pp. 466–471, doi: 10.1109/SNAMS.2019.8931839.
- [10] N. Kalchbrenner, E. Grefenstette, and P. Blunsom, "A Convolutional Neural Network for Modelling Sentences," *In Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, Jan. 2014, doi: 10.3115/v1/p14-1062.
- [11] S. Minaee, N. Kalchbrenner, E. Cambria, N. Nikzad, M. Chenaghlu, and J. Gao, "Deep learning--based text classification," *ACM Computing Surveys*, vol. 54, no. 3, pp. 1–40, Apr. 2021, doi: 10.1145/3439726.
- [12] S. Santhanam, "Context based Text-generation using LSTM networks," *arXiv*, Apr. 30, 2020. <https://arxiv.org/abs/2005.00048>.
- [13] A. H. Ombabi, W. Ouarda, and A. M. Alimi, "Improving Arabic sentiment analysis across context-aware attention deep model based on natural language processing," *Language Resources and Evaluation*, Apr. 2024, doi: 10.1007/s10579-024-09741-z.
- [14] A. U. Rehman, A. K. Malik, B. Raza, and W. Ali, "A hybrid CNN-LSTM model for improving accuracy of movie reviews sentiment analysis," *Multimedia Tools and Applications*, vol. 78, no. 18, pp. 26597–26613, Jun. 2019, doi: 10.1007/s11042-019-07788-7.
- [15] N. Hossain, Md. R. Bhuiyan, Z. N. Tumpa, and S. A. Hossain, "Sentiment Analysis of Restaurant Reviews using Combined CNN-LSTM," *2022 13th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, pp. 1–5, Jul. 2020, doi: 10.1109/icccnt49239.2020.9225328.
- [16] B. M. G. A. Awienoor, and E. Setiawan, "Movie Recommendation System Based on Tweets Using Switching Hybrid Filtering with Recurrent Neural Network," *International Journal of Intelligent Engineering and Systems*, vol. 17, no. 2, pp. 277–293, Feb. 2024, doi: 10.22266/ijies2024.0430.24.
- [17] F. Alharbi, L. Ouarbya, and J. A. Ward, "Comparing sampling strategies for tackling imbalanced data in human activity recognition," *Sensors*, vol. 22, no. 4, p. 1373, Feb. 2022, doi: 10.3390/s22041373.
- [18] F. Rifaldy, Y. Sibaroni, and S. S. Prasetyowati, "Effectiveness of Word2VEC and TF-IDF in sentiment classification on online investment platforms using support Vector Machine," *JUPI (Jurnal Ilmiah Penelitian Dan Pembelajaran Informatika)*, vol. 10, no. 2, pp. 863–874, Mar. 2025, doi: 10.29100/jupi.v10i2.6055.
- [19] A. I. Kadhim, "Term weighting for feature extraction on Twitter: A comparison between BM25 and TF-IDF," *2019 International Conference on Advanced Science and Engineering (ICOASE)*, pp. 124–128, Apr. 2019, doi: 10.1109/icoase.2019.8723825.
- [20] N. I. R. Illahi and E. B. Setiawan, "Sentiment Analysis on Social Media Using Fasttext Feature Expansion and Recurrent Neural Network (RNN) with Genetic Algorithm Optimization," *International Journal on Information and Communication Technology (IJoICT)*, vol. 10, no. 1, pp. 78–89, Jun. 2024, doi: 10.21108/ijoict.v10i1.905.
- [21] N. Nedjah, I. Santos, and L. De Macedo Mourelle, "Sentiment analysis using convolutional neural network via word embeddings," *Evolutionary Intelligence*, vol. 15, no. 4, pp. 2295–2319, Apr. 2019, doi: 10.1007/s12065-019-00227-4.
- [22] M. Z. F. Rizky, Y. Sibaroni, and S. S. Prasetyowati, "Sentiment Analysis on TikTok App using Long Short-Term Memory (LSTM) with Stochastic Gradient Descent (SGD) Optimization," *JURNAL MEDIA INFORMATIKA BUDIDARMA*, vol. 8, no. 3, p. 1292, Jul. 2024, doi: 10.30865/mib.v8i3.7699.
- [23] N. Uly, H. Hendry, and A. Iriani, "CNN-RNN hybrid model for diagnosis of COVID-19 on X-Ray imagery," *Digital Zone Jurnal Teknologi Informasi Dan Komunikasi*, vol. 14, no. 1, pp. 57–67, May 2023, doi: 10.31849/digitalzone.v14i1.13668.
- [24] A. Ishaq, S. Asghar, and S. A. Gillani, "Aspect-Based sentiment analysis using a hybridized approach based on CNN and GA," *IEEE Access*, vol. 8, pp. 135499–135512, Jan. 2020, doi: 10.1109/access.2020.3011802.
- [25] B. Liu, "Text sentiment analysis based on CBOW model and deep learning in big data environment," *Journal of Ambient Intelligence and Humanized Computing*, vol. 11, no. 2, pp. 451–458, Oct. 2018, doi: 10.1007/s12652-018-1095-6.
- [26] M. Ihsan, N. B. S. Negara, and N. S. Agustian, "LSTM (Long Short Term Memory) for Sentiment COVID-19 vaccine classification on Twitter," *Digital Zone Jurnal Teknologi Informasi Dan Komunikasi*, vol. 13, no. 1, pp. 79–89, May 2022, doi: 10.31849/digitalzone.v13i1.9950.
- [27] N. Dr. G. S. N. Murthy, N. S. R. Allu, N. B. Andhavarapu, and N. M. B. M. Belusonti, "Text based Sentiment Analysis using LSTM," *International Journal of Engineering Research*, vol. V9, no. 05, May 2020, doi: 10.17577/ijertv9is050290.
- [28] C. Sahoo, M. Wankhade, and B. K. Singh, "Sentiment analysis using deep learning techniques: a comprehensive review," *International Journal of Multimedia Information Retrieval*, vol. 12, no. 2, Nov. 2023, doi: 10.1007/s13735-023-00308-2.
- [29] J. Wang, L.-C. Yu, K. R. Lai, and X. Zhang, "Tree-Structured Regional CNN-LSTM Model for dimensional Sentiment Analysis," *IEEE/ACM Transactions on Audio Speech and Language Processing*, vol. 28, pp. 581–591, Dec. 2019, doi: 10.1109/taslp.2019.2959251.
- [30] W. Li, L. Zhu, Y. Shi, K. Guo, and E. Cambria, "User reviews: Sentiment analysis using lexicon integrated two-channel CNN-LSTM family models," *Applied Soft Computing*, vol. 94, p. 106435, Jun. 2020, doi: 10.1016/j.asoc.2020.106435.
- [31] A. B. Syahputri and Y. Sibaroni, "Comparative Analysis of CNN and LSTM Performance for Hate Speech Detection on Twitter," *2023 11th International Conference on Information and Communication Technology (ICoICT)*, pp. 190–195, Aug. 2023, doi: 10.1109/icoict58202.2023.10262656.
- [32] H. Zhou, "Research of text classification based on TF-IDF and CNN-LSTM," *Journal of Physics Conference Series*, vol. 2171, no. 1, p. 012021, Jan. 2022, doi: 10.1088/1742-6596/2171/1/012021.

- [33]I. Priyadarshini and C. Cotton, "A novel LSTM–CNN–grid search-based deep neural network for sentiment analysis," *The Journal of Supercomputing*, vol. 77, no. 12, pp. 13911–13932, May 2021, doi: 10.1007/s11227-021-03838-w.
- [34]A. Bekkar, B. Hssina, S. Douzi, and K. Douzi, "Air-pollution prediction in smart city, deep learning approach," *Journal of Big Data*, vol. 8, no. 1, Dec. 2021, doi: 10.1186/s40537-021-00548-1.
- [35]A. H. Ombabi, W. Ouarda, and A. M. Alimi, "Deep learning CNN–LSTM framework for Arabic sentiment analysis using textual information shared in social networks," *Social Network Analysis and Mining*, vol. 10, no. 1, Jul. 2020, doi: 10.1007/s13278-020-00668-1.
- [36]L. Khan, A. Amjad, K. M. Afaq, and H.-T. Chang, "Deep sentiment analysis using CNN-LSTM architecture of English and Roman Urdu text shared in social media," *Applied Sciences*, vol. 12, no. 5, p. 2694, Mar. 2022, doi: 10.3390/app12052694.
- [37]S. Sejwal, N. Faujdar, and S. Saraswat, "Sentiment analysis using hybrid CNN-LSTM approach," *2021 5th International Conference on Information Systems and Computer Networks (ISCON)*, pp. 1–6, Oct. 2021, doi: 10.1109/iscon52037.2021.9702449.
- [38]S. H. Eom, "Developing sentimental analysis system based on various optimizer," *The International Journal of Internet, Broadcasting and Communication*, vol. 13, no. 1, pp. 100–106, Feb. 2021, doi: 10.7236/ijibc.2021.13.1.100.
- [39]N. Fatima, "Enhancing performance of a deep neural network: A comparative analysis of optimization Algorithms," *ADCAIJ ADVANCES IN DISTRIBUTED COMPUTING AND ARTIFICIAL INTELLIGENCE JOURNAL*, vol. 9, no. 2, pp. 79–90, Jun. 2020, doi: 10.14201/adcaij2020927990.
- [40]T.-T. Wong and P.-Y. Yeh, "Reliable Accuracy Estimates from k-Fold Cross Validation," *IEEE Transactions on Knowledge and Data Engineering*, vol. 32, no. 8, pp. 1586–1594, Apr. 2019, doi: 10.1109/tkde.2019.2912815.
- [41]O. Chamorro-Atalaya et al., "K-Fold Cross-Validation through Identification of the Opinion Classification Algorithm for the Satisfaction of University Students," *International Journal of Online and Biomedical Engineering (iJOE)*, vol. 19, no. 11, Aug. 2023, doi: 10.3991/ijoe.v19i11.39887.