

- 2017 Conference on Empirical Methods in Natural Language Processing. Association for Computational Linguistics, 452–461.
- [2] Mark Cieliebak, Jan Milan Deriu, Dominic Egger, and Fatih Uzdilli. 2017. A Twitter corpus and benchmark resources for German sentiment analysis. In *5th International Workshop on Natural Language Processing for Social Media, Boston, MA, USA, December 11, 2017*. Association for Computational Linguistics, 45–51.
 - [3] G David Forney. 1973. The viterbi algorithm. *Proc. IEEE* 61, 3 (1973), 268–278.
 - [4] Xavier Glorot and Yoshua Bengio. 2010. Understanding the difficulty of training deep feedforward neural networks. In *Proceedings of the thirteenth international conference on artificial intelligence and statistics*. 249–256.
 - [5] Devamanyu Hazarika, Soujanya Poria, Prateek Vij, Gangeshwar Krishnamurthy, Erik Cambria, and Roger Zimmermann. 2018. Modeling Inter-Aspect Dependencies for Aspect-Based Sentiment Analysis. In *Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 2 (Short Papers)*. Association for Computational Linguistics, 266–270.
 - [6] Minqing Hu and Bing Liu. 2004. Mining and summarizing customer reviews. In *Proceedings of the tenth ACM SIGKDD international conference on Knowledge discovery and data mining*. ACM, 168–177.
 - [7] Binxuan Huang and Kathleen Carley. 2018. Parameterized Convolutional Neural Networks for Aspect Level Sentiment Classification. In *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*. Association for Computational Linguistics, 1091–1096.
 - [8] Niklas Jakob and Iryna Gurevych. 2010. Extracting opinion targets in a single-and cross-domain setting with conditional random fields. In *Proceedings of the 2010 conference on empirical methods in natural language processing*. Association for Computational Linguistics, 1035–1045.
 - [9] Wei Jin, Hung Hay Ho, and Rohini K Srihari. 2009. A novel lexicalized HMM-based learning framework for web opinion mining. In *Proceedings of the 26th annual international conference on machine learning*. Citeseer, 465–472.
 - [10] Diederik P Kingma and Jimmy Ba. 2014. Adam: A method for stochastic optimization. *arXiv preprint arXiv:1412.6980* (2014).
 - [11] Svetlana Kiritchenko, Xiaodan Zhu, Colin Cherry, and Saif Mohammad. 2014. NRC-Canada-2014: Detecting aspects and sentiment in customer reviews. In *Proceedings of the 8th International Workshop on Semantic Evaluation (SemEval 2014)*. 437–442.
 - [12] Roman Klinger and Philipp Cimiano. 2013. Bi-directional inter-dependencies of subjective expressions and targets and their value for a joint model. In *Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*, Vol. 2. 848–854.
 - [13] John Lafferty, Andrew McCallum, and Fernando CN Pereira. 2001. Conditional random fields: Probabilistic models for segmenting and labeling sequence data. (2001).
 - [14] Hao Li and Wei Lu. 2017. Learning latent sentiment scopes for entity-level sentiment analysis. In *Thirty-First AAAI Conference on Artificial Intelligence*.
 - [15] Xin Li, Lidong Bing, Wai Lam, and Bei Shi. 2018. Transformation Networks for Target-Oriented Sentiment Classification. In *Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*. Association for Computational Linguistics, 946–956.
 - [16] Xin Li, Lidong Bing, Piji Li, and Wai Lam. 2018. A Unified Model for Opinion Target Extraction and Target Sentiment Prediction. *arXiv preprint arXiv:1811.05082* (2018).
 - [17] Xin Li, Lidong Bing, Piji Li, Wai Lam, and Zhimou Yang. 2018. Aspect Term Extraction with History Attention and Selective Transformation. In *Proceedings of the Twenty-Seventh International Joint Conference on Artificial Intelligence, IJCAI 2018, July 13-19, 2018, Stockholm, Sweden*. 4194–4200.
 - [18] Pengfei Liu, Shafiq Joty, and Helen Meng. 2015. Fine-grained opinion mining with recurrent neural networks and word embeddings. In *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing*. 1433–1443.
 - [19] Qian Liu, Zhiqiang Gao, Bing Liu, and Yuanlin Zhang. 2015. Automated Rule Selection for Aspect Extraction in Opinion Mining.
 - [20] Dehong Ma, Sujian Li, and Houfeng Wang. 2018. Joint Learning for Targeted Sentiment Analysis. In *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*. 4737–4742.
 - [21] Dehong Ma, Sujian Li, Xiaodong Zhang, and Houfeng Wang. 2017. Interactive Attention Networks for Aspect-Level Sentiment Classification. In *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence, IJCAI 2017, Melbourne, Australia, August 19-25, 2017*. 4068–4074.
 - [22] Navonil Majumder, Soujanya Poria, Alexander Gelbukh, Md Shad Akhtar, Erik Cambria, and Asif Ekbal. 2018. IARM: Inter-aspect relation modeling with memory networks in aspect-based sentiment analysis. In *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*. 3402–3411.
 - [23] Margaret Mitchell, Jacqui Aguilar, Theresa Wilson, and Benjamin Van Durme. 2013. Open Domain Targeted Sentiment. In *Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing, EMNLP 2013, 18-21 October 2013, Grand Hyatt Seattle, Seattle, Washington, USA, A meeting of SIGDAT, a Special Interest Group of the ACL*. 1643–1654.
 - [24] Jeffrey Pennington, Richard Socher, and Christopher Manning. 2014. Glove: Global vectors for word representation. In *Proceedings of the 2014 conference on empirical methods in natural language processing (EMNLP)*. 1532–1543.
 - [25] Maria Pontiki, John Galanis, Dimitris Pavlopoulos, Haris Papageorgiou, Ion Androutsopoulos, and Suresh Manandhar. 2014. SemEval-2014 Task 4: Aspect Based Sentiment Analysis. In *Proceedings of the 8th international workshop on semantic evaluation (SemEval-2014)*. 19–30.
 - [26] Ana-Maria Popescu and Orena Etzioni. 2007. Extracting product features and opinions from reviews. In *Natural language processing and text mining*. Springer, 9–28.
 - [27] Mike Schuster and Kuldip K Paliwal. 1997. Bidirectional recurrent neural networks. *IEEE Transactions on Signal Processing* 45, 11 (1997), 2673–2681.
 - [28] Lei Shu, Hu Xu, and Bing Liu. 2017. Lifelong learning crf for supervised aspect extraction. *arXiv preprint arXiv:1705.00251* (2017).
 - [29] Duyu Tang, Bing Qin, and Ting Liu. 2016. Aspect Level Sentiment Classification with Deep Memory Network. In *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*. Association for Computational Linguistics, 214–224.
 - [30] Yi Tay, Luu Anh Tuan, and Siu Cheung Hui. 2017. Dyadic Memory Networks for Aspect-based Sentiment Analysis. In *Proceedings of the 2017 ACM on Conference on Information and Knowledge Management, CIKM 2017, Singapore, November 06 - 10, 2017*. 107–116.
 - [31] Erik F Tjong Kim Sang and Fien De Meulder. 2003. Introduction to the CoNLL-2003 shared task: Language-independent named entity recognition. In *Proceedings of the seventh conference on Natural language learning at HLT-NAACL 2003-Volume 4*. Association for Computational Linguistics, 142–147.
 - [32] Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N Gomez, Łukasz Kaiser, and Illia Polosukhin. 2017. Attention is All you Need. In *Advances in Neural Information Processing Systems 30*, I. Guyon, U. V. Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan, and R. Garnett (Eds.). Curran Associates, Inc., 5998–6008.
 - [33] Shuai Wang, Sahisnu Mazumder, Bing Liu, Mianwei Zhou, and Yi Chang. 2018. Target-sensitive memory networks for aspect sentiment classification. In *Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, Vol. 1. 957–967.
 - [34] Wenyua Wang, Sinno Jialin Pan, Daniel Dahlmeier, and Xiaokui Xiao. 2016. Recursive neural conditional random fields for aspect-based sentiment analysis. *arXiv preprint arXiv:1603.06679* (2016).
 - [35] Wenyua Wang, Sinno Jialin Pan, Daniel Dahlmeier, and Xiaokui Xiao. 2017. Coupled Multi-Layer Attentions for Co-Extraction of Aspect and Opinion Terms. In *Proceedings of The Thirty-First AAAI Conference on Artificial Intelligence*. 3316–3322.
 - [36] Yequan Wang, Minlie Huang, Xiaoyan Zhu, and Li Zhao. 2016. Attention-based LSTM for Aspect-level Sentiment Classification. In *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*. Association for Computational Linguistics, 606–615.
 - [37] Hu Xu, Bing Liu, Lei Shu, and Philip S. Yu. 2018. Double Embeddings and CNN-based Sequence Labeling for Aspect Extraction. In *Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics, ACL 2018, Melbourne, Australia, July 15-20, 2018, Volume 2: Short Papers*. 592–598.
 - [38] Hu Xu, Bing Liu, Lei Shu, and Philip S Yu. 2018. Double Embeddings and CNN-based Sequence Labeling for Aspect Extraction. *arXiv preprint arXiv:1805.04601* (2018).
 - [39] Wei Xue and Tao Li. 2018. Aspect Based Sentiment Analysis with Gated Convolutional Networks. In *Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*. Association for Computational Linguistics, 2514–2523.
 - [40] Bishan Yang and Claire Cardie. 2013. Joint Inference for Fine-grained Opinion Extraction. In *Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics, ACL 2013, 4-9 August 2013, Sofia, Bulgaria, Volume 1: Long Papers*. 1640–1649.
 - [41] Yichun Yin, Furu Wei, Li Dong, Kaimeng Xu, Ming Zhang, and Ming Zhou. 2016. Unsupervised word and dependency path embeddings for aspect term extraction. *arXiv preprint arXiv:1605.07843* (2016).
 - [42] Jianxing Yu, Zheng-Jun Zha, Meng Wang, and Tat-Seng Chua. 2011. Aspect ranking: identifying important product aspects from online consumer reviews. In *Proceedings of the 49th Annual Meeting of the Association for Computational Linguistics: Human Language Technologies-Volume 1*. Association for Computational Linguistics, 1496–1505.
 - [43] Meishan Zhang, Yue Zhang, and Duy-Tin Vo. 2015. Neural Networks for Open Domain Targeted Sentiment. In *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing, EMNLP 2015, Lisbon, Portugal, September 17-21, 2015*. 612–621.