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Domain	Sentiment Analysis in Social Media

	PAPER 1	PAPER 2	PAPER 3
Title of the paper	Transformer Based Multi-Grained Attention Network for Aspect-Based Sentiment Analysis	TSA-CNN-AOA: Twitter sentiment analysis using CNN optimized via arithmetic optimization algorithm	Transformer-based deep learning models for the sentiment analysis of social media data
Authors	JIAHUI SUN PING HAN ZHENG CHENG ENMING WU WENQING WANG	Serpil Aslan Soner Kızıloluk Eser Sert	Sayyida Tabinda Kokab Sohail Asghar Shehneela Naz
Year of publication	2020	2012	2022
Network used	Transformer model	Convolutional neural network	Dilated convolutional Bi-LSTM model
Depth of the network	5	6	7
How is the network helping the overall task? eg: feature engg or classification or regression or all	Neural network models, have been making new progress in NLP tasks, and there are several methods have good performances in ABSA tasks. The model based on the convolutional neural network (CNN) can obtain the dependencies between words and semantic features of the sentences by using a window-fixed filter. However, the important structural information of sentences cannot be extracted. The model based on Recurrent neural network (RNN) and its derived models, such as long short-term memory (LSTM) and gated recurrent units (GRU), treat sentences as word sequences and can obtain the effective syntactic level features. Therefore, these sequential models have achieving competitive results in ABSA task. However, the mechanism of long short-term memory adopted by such models will lead to the superposition of emotional semantics. When there are multiple specific aspects with inconsistent sentiment polarity in a sentence, the resolution of the model will be affected, and the dependency between words in the sentence will be weakened with the increase of distance. The attention mechanism can effectively focus on the important information.	CNN has been a popular method for TSA in recent years. The present study, too, created a database consisting of tweets about COVID-19 for TSA to propose a new CNN-based hybrid approach. To this aim, tweets about COVID-19 were extracted from Twitter to create a large database and propose Twitter sentiment analysis using convolutional neural network optimized via arithmetic optimization algorithm (TSA-CNN-AOA). The proposed approach attempted to classify individuals' tweets about COVID-19 into three main categories: positive, negative, and neutral. Thus, it has become possible to reach significant conclusions about people's attitude toward the COVID-19 pandemic, which can help lessen and eliminate the impact of the disease on them. The experimental studies were performed to test the classification accuracy performances of TSA-CNN-AOA (Decision tree), TSA-CNN-AOA (SVM), and TSA-CNN-AOA (KNN) on the dataset, which yielded an accuracy rate of 92.533%, 95.007%, and 95.098%, respectively. Additionally, CNN, SVM, Naive Bayes, logistic regression, decision tree, and KNN approaches were also used for the testing process, and the highest classification accuracy rate was achieved by TSA-CNN-AOA (KNN)	A novel neural word embedding-based approach was suggested by for SA across several domains. They addressed the major limitations of existing methods, which did not perform well on using in other domains than the domain it was trained on. Their new technique outperformed the old one by achieving higher performance. However, these approaches required a large training corpus for generating accurate vectors. In 2019, another word embedding vector was proposed. They called it model Improved Word Vector (IWV), which was a combination of Parts of Speech (POS) tagging methods, word2vec/glove models, lexicon-based method, and word localization algorithm. Four datasets were used to conduct sentence-level classification using CNN classifier. However, the main downside of all these methods is the cost of finding the opinion/emotion orientation of all word individually in the built-in vocabulary. Furthermore, it is possible that the emotion/opinion orientation terms may vary by domain

Loss function used	Softmax , Tanh	Softmax , Tanh	
Evaluation / Performance metric used	Accuracy	Accuracy, F1-score, precision and recall results	Accuracy, F1-score, precision , recall , AUC
Name of Dataset used. If a public dataset, provide the URL.	https://github.com/yangheng95/ABSADatasets/tree/v2	https://drive.google.com/drive/folders/1S3SFatKgOA0lzzITgfyNrB	https://www.kaggle.com/c/cifar-10/
Conclusion			
<p>Paper 1 proposes T-MGAN model for aspect-based sentiment analysis. It combines Transformer Encoder and Tree Transformer Encoder with specific sub-tasks, utilize T-MGAN to model the word-level and phrase-level features of aspects and contexts. T-MGAN not only acquires semantic features, but also effectively obtains language hierarchy and syntax information. In addition, the dual-pooling method is used to extract the key features in the hidden layer features of aspect and context, and the attention mechanism is used multiple times to effectively obtain the fine-grained associated emotional features between the specific aspect and the context. Through the attention weight visualization, it is verified that the Transformer Encoder module in this model can effectively focus on the important words in the sentence, while the Tree Transformer Encoder module can learn syntactic information to effectively focus on important phrases</p> <p>Paper 2 uses CNN model for TSA. The present study, too, created a database consisting of tweets about COVID-19 for TSA to propose a new CNN-based hybrid approach. To this aim, tweets about COVID-19 were extracted from Twitter to create a large database and propose Twitter sentiment analysis using convolutional neural network optimized via arithmetic optimization algorithm (TSA-CNN-AOA). The proposed approach attempted to classify individuals' tweets about COVID-19 into three main categories: positive, negative, and neutral. Thus, it has become possible to reach significant conclusions about people's attitude toward the COVID-19 pandemic, which can help lessen and eliminate the impact of the disease on them.</p> <p>Paper 3 uses an enhanced feature extraction and classification model using BERT model and dilated convolutional Bi-LSTM model. A BERT-based CBRNN SA model has been proposed for sentence-level classification. The data were annotated using zero-shot BERT, then a pre-trained BERT model was employed to obtain sentence-level semantics and contextual features from the data. The obtained results are then compared with the most commonly used embedding models, such as glove and word2vec. The proposed model in paper 3 obtained significant improvement in f1-score 0.2%, accuracy 0.3% and AUC 0.4%</p> <p>We can see all the 3 papers are focussing on social media data and sentiment analysis. There are below multiple reasons to use the paper 2 "Twitter sentiment analysis using CNN optimized via arithmetic optimization algorithm" as a paper of</p>			