Deep learning model algorithm for sentiment analysis

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We are living in an era of astonishing data proliferation and the sharing of user-created content across all kinds of media, from social networks to news sites, e-commerce reviews to endless forums for every kind of interest and niche.

Being able to accurately interpret emotions conveyed through such messages is increasingly important for social science and politics, in

marketing, business, and economics, and elsewhere.

Recent advancements in the field of so-called "sentiment analysis" have led to the development of more sophisticated models capable of extracting and interpreting emotional subtleties in textual data. One such model is the BERT-ABiLSTM—Bidirectional Encoder Representations from Transformers, Attention Bidirectional Long Short-Term Memory.

Research published in the *International Journal of Information and Communication Technology* reports on how this large-scale pre-trained algorithm can be used for sentiment analysis. However, as author Zhubin Luo, of the Hunan University of Humanities, Science and Technology in China, points out, the system's use of ABiLSTM, means there are some limitations as it focuses on global features and can overlook nuance.

BERT, Luo explains, can learn language representations from extensive bodies of text. The ABiLSTM, a recurrent neural network, processes text sequences. Luo has now added TextCNN (Text Convolutional Neural Network) to the system to make BERT-CNN-ABiLSTM, a more sophisticated version of the model.

Overall, the underlying bidirectional approach allows the model to understand context from both past-to-future and future-to-past segments of text. This is important for capturing long-term dependencies in text. The attention mechanism within ABiLSTM further refines this by enabling the model to focus on the most pertinent parts of the text when making predictions, thus improving the accuracy of sentiment analysis.

The TextCNN component then uses convolutional kernels of various sizes to detect different granularities of features within the text. This allows the model to capture much more subtle local patterns within the text that would have been missed by simpler models, thus providing a yet more detailed analysis of textual content.

The improvements reported by Luo are particularly relevant for scenarios that require detailed text classification and recognition. This might include sentiment analysis on social media, evaluating customer feedback in e-commerce platforms, or empowering "intelligent" online question-and-answer systems.

More information: Zhubin Luo, A study into text sentiment analysis model based on deep learning, *International Journal of Information and Communication Technology* (2024). DOI: 10.1504/IJICT.2024.139869

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