The IEEE Transactions on Knowledge and Data Engineering article titled "Dual Consistency-Enhanced Semi-Supervised Sentiment Analysis Towards COVID-19 Tweets" by Teng Sun, Liqiang Jing, Yinwei Wei, Xuemeng Song, Zhiyong Cheng, and Liqiang Nie addresses the challenge of sentiment analysis on COVID-19-related tweets. The authors propose a novel semi-supervised model, COVID-SA, which leverages a large-scale dataset from Weibo and employs a dual consistency regularization technique to improve sentiment classification performance.

The research identifies two primary challenges: the domain gap between sentiment analysis in other fields and COVID-19 tweets, and the limited availability of annotated data for model training. To address these, the authors introduce a knowledge-based data augmentation method and utilize BERT as the text encoder. The dual consistency regularization focuses on both label-oriented and instance-oriented consistency, which enhances model robustness and performance.

Extensive experiments on the self-constructed Weibo dataset and three public datasets demonstrate that COVID-SA outperforms state-of-the-art baselines across various applications. The authors also highlight the effectiveness of their knowledge-based data augmentation method compared to traditional back translation, especially for informal text like social media posts.

The paper concludes that the proposed model is superior in scenarios with limited labeled data and suggests future work in multimodal sentiment analysis. The authors have made their dataset, source code, and trained parameters publicly available to facilitate further research.