Review of: "EEG-based Emotion Classification using Deep Learning: Approaches, Trends and Bibliometrics"

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Potential competing interests: No potential competing interests to declare.

The article "EEG-based Emotion Classification using Deep Learning: Approaches, Trends, and Bibliometrics" investigates the classification of human emotions using electroencephalography (EEG) signals and deep learning methods. The authors conducted an extensive bibliometric analysis of 440 articles from the Scopus database to map the research evolution in this field, identify current trends, highlight significant contributions, and point out areas needing further exploration. They noted a marked increase in research activity after 2018, indicating a growing interest in emotion classification using EEG.

The paper underscores the rising importance of emotion classification across various domains such as mental health, psychology, and human-computer interaction, due to its potential role in enhancing the understanding of human behavior and social interactions. It also emphasizes the critical role of EEG signals, which, due to their non-intrusive nature and ability to capture the temporal dynamics of emotional processes accurately, emerge as a promising tool for emotion classification.

The authors discuss advancements in using deep learning techniques for EEG data analysis, including convolutional neural networks, recurrent networks, and attention mechanisms, which have shown the ability to improve emotion classification accuracy. However, challenges remain, particularly regarding the standardization of evaluation approaches and the need for increased collaboration among researchers to develop a shared understanding that could guide future research and practical applications.

Critically, we can identify ten points focusing on potential weaknesses and areas for improvement based on the provided text. Here are the critique points:

1. The bibliometric analysis primarily relies on data from the Scopus database. While Scopus is reputable, excluding other databases like PubMed, IEEE Xplore, or Google Scholar could overlook significant contributions to the field. On the other hand, the analysis highlights China's predominant contribution to the field. While this showcases a regional strength, it also suggests potential biases or gaps in global research representation, particularly from countries with less scientific output but potentially innovative approaches.
2. The article heavily focuses on deep learning techniques for emotion classification using EEG data. While deep learning is at the forefront of technological advances, incorporating a broader range of methodologies, including traditional machine learning or hybrid approaches, could provide a more comprehensive view of the field.

3. The detailed discussions on deep learning architectures and EEG-based methodologies are critical for scientific discourse. However, the article could benefit from a clearer linkage between these technical aspects and their practical implications in real-world applications.
4. While the article mentions the challenges in emotion classification, such as the need for standardized assessment criteria, it could further explore the inherent limitations of EEG technology, deep learning models, and their implications for reliability and generalizability.
5. Emotion classification intersects with psychology, neuroscience, ethics, and computer science. A more explicit acknowledgment of these interdisciplinary contributions could enrich the understanding of emotion classification's complexities and societal impact.
6. While bibliometric analysis provides valuable insights into research trends and contributions, qualitative critiques of seminal works and their theoretical contributions could offer depth to the understanding of the field's evolution.
7. Although the article touches upon applications in healthcare, psychology, and human-computer interaction, a more detailed exploration of how current research translates into practical tools and interventions would demonstrate the field's real-world impact more effectively.

By addressing these areas, the article could provide a more balanced, comprehensive, and forward-looking perspective on EEG-based emotion classification using deep learning, enhancing its value to both academic and practical audiences.