Towards Better Qualitative Behaviors of Deep Learning Models for EEG-based Emotion Recognition

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Abstract: Emotion recognition from EEG signals presents significant challenges due to the high variability of the signals and the limited understanding of the underlying neural mechanisms. While deep learning models have demonstrated promising results in this field, their interpretability remains a critical concern. A notable issue in existing studies is the common assumption that global emotion labels assigned to entire trials can be directly applied to local EEG segments for training. This approach overlooks potential discrepancies and fluctuations between local and global emotional states, which may lead to inconsistencies with clinical priors and raise trustworthiness concerns in practical applications. To address this issue, the integration of relevant mathematical tools can help quantify and align expected qualitative behaviors with observed data. Preliminary results highlight the effectiveness of these tools across multiple aspects, underscoring their potential for further exploration and application in emotion recognition research.