Graduate School of Science and Technology Master's Thesis Abstract

Laboratory name (Supervisor)	Mathematical Informatics (Kazushi Ikeda (Professor))		
Student ID	2411336	Submission date	2026 / 1 / 16
Name	CHU SHIWEN		
Thesis title	Enhancing Cross-subject emotion classification performance using resting-state EEG and multimodal features		

Abstract

Electroencephalography (EEG) provides a direct, temporally precise window into affective brain dynamics, making it a valuable modality for emotion recognition. However, cross-subject EEG-based emotion recognition faces persistent challenges due to substantial inter-subject variability and the scarcity of labeled data from new users. While multimodal fusion and deep learning have improved performance in controlled settings, their generalization across individuals remains limited. To address this, we propose ResMF, a novel transfer learning framework that personalizes a general model using only unlabeled resting-state EEG, eliminating the need for task-specific calibration. ResMF disentangles subject- and emotion-specific representations and employs a Cross-Modal Attention mechanism to dynamically fuse EEG signals with facial Action Unit features. Our findings suggest that leveraging resting-state EEG alongside multimodal cues holds strong potential for building more robust and scalable emotion recognition systems.