

## Individualized Emotion Recognition Through Dual-Representations and Ground-Established Ground Truth

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**Abstract :** While facial expression is a complex and individualized behavior, all facial emotion recognition (FER) systems known to us rely on a single facial representation and are trained on universal data. We conjecture that: (i) different facial representations can provide different, sometimes complementing views of emotions; (ii) when employed collectively in a discussion group setting, they enable more accurate emotion reading which is highly desirable in autism care and other applications context sensitive to errors. In this paper, we first study FER using pixel-based DL vs semantics-based DL in the context of deepfake videos. Our experiment indicates that while the semantics-trained model performs better with articulated facial feature changes, the pixel-trained model outperforms on subtle or rare facial expressions. Armed with these findings, we have constructed an adaptive FER system learning from both types of models for dyadic or small interacting groups and further leveraging the synthesized group emotions as the ground truth for individualized FER training. Using a collection of group conversation videos, we demonstrate that FER accuracy and personalization can benefit from such an approach.

**Keywords :** neurodivergence care, facial emotion recognition, deep learning, ground truth for supervised learning

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