Emotion-Aware Child Monitoring System

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Abstract: *This document details a newly developed intelligent system. The system performs real-time monitoring of children while simultaneously assessing their emotional responses. Facial expression analysis is a core component of the system's design, enabling it to interpret human emotional states. Employing a deep learning architecture and leveraging the FER-2013 dataset for its training, this emotion recognition model analyses input from a webcam, providing a classification of the observed emotional state into one of seven predetermined categories. To improve the accuracy of live emotion recognition, a technique utilising a frame buffer and a majority voting process to smooth temporal data was applied, resulting in more consistent predictions. Concurrently, the system's interactive graphical user interface presents both real-time video and the results of the emotion detection process. The system incorporates an alert mechanism that informs caregivers of prolonged negative emotional states, such as sadness or anger, thus facilitating prompt intervention. The suggested system offers a practical illustration of the application of affective computing in child-centered settings and sets the foundation for upcoming developments, including multi-modal emotion evaluation and cloud-based data integration.*

Keywords: CNNs, FER-2013, Deep Learning, Frame Buffer