Research on some methods of image feature extraction and application in the problem of facial emotion state classification

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Abstract: This study investigates feature extraction methods for facial expression recognition and their application in classifying emotional states. The research addresses the challenge of effectively capturing discriminative features from facial images to improve classification accuracy. Several techniques, including Local Binary Patterns (LBP), Histogram of Oriented Gradients (HOG), and deep learning-based feature extraction using Convolutional Neural Networks (CNNs), are examined and compared. Experiments are conducted on benchmark facial expression datasets to evaluate the performance of each method in recognizing basic emotions such as happiness, sadness, anger, surprise, fear, and disgust. The results demonstrate that deep learning approaches significantly outperform traditional handcrafted features in terms of accuracy and robustness to variations in lighting and pose. However, the study also highlights the computational trade-offs involved. The findings contribute to the development of more effective automated systems for human-computer interaction, affective computing, and psychological analysis.

Keywords: image feature extraction, facial emotion classification, image processing, machine learning