

Region-based facial expression recognition in still images.

Abstract

In Facial Expression Recognition Systems (FERS), only particular regions of the face are utilized for discrimination. The areas of the eyes, eyebrows, nose, and mouth are the most important features in any FERS. Applying facial features descriptors such as the local binary pattern (LBP) on such areas results in an effective and efficient FERS. In this paper, we propose an automatic facial expression recognition system. Unlike other systems, it detects and extracts the informative and discriminant regions of the face (i.e., eyes, nose, and mouth areas) using Haar-feature based cascade classifiers and these region-based features are stored into separate image files as a preprocessing step. Then, LBP is applied to these image files for facial texture representation and a feature-vector per subject is obtained by concatenating the resulting LBP histograms of the decomposed region-based features. The one-vs-rest SVM, which is a popular multi-classification method, is employed with the Radial Basis Function (RBF) for facial expression classification. Experimental results show that this approach yields good performance for both frontal and near-frontal facial images in terms of accuracy and time complexity. Cohn-Kanade and JAFFE, which are benchmark facial expression datasets, are used to evaluate this approach.

Keyword: Facial Expression Recognition (FER); Facial features detection; Facial features extraction; Cascade classifier; LBP; One-vs-rest SVM.