Small Sample Size (SSS), varying illuminations and facial expressions are three important challenges for any face recognition system. Many studies have addressed these challenges by using some different pre-processing and feature extraction techniques, but a lot of these techniques are still facing the performance issues with these challenges. Therefore a reliable system based on single image is presented in this paper to deal with the above challenges together by using robust pre-processing chain with a powerful feature extraction method, where the proposed pre-processing chain consists of Difference of Gaussian (DoG) filter and wavelet-based normalization with histogram equalization technique, this chain has been selected carefully based on the compatibility between their elements and their effectiveness in dealing with illumination effects, local shadows and highlights, then the Regularized Linear Discriminate Analysis (RLDA) is used as a robust feature extraction, the RLDA very effective method in the case of small sample size and facial expressions due to the addition of the regularized parameter to the traditional method (LDA), the extracted features have classified by using different distance classifiers (cosine and correlation classifiers).
The proposed system was tested by using three standard databases (Extended Yale-B, JAFFE, AR) which contain the above challenges.

References


Index Terms
Keywords

Face recognition, Varying illuminations, small sample size, Facial expressions, Regularized Linear Discriminate Analysis.