

Luminance sticker based facial expression recognition using discrete wavelet transform for physically disabled persons

Abstract

Developing tools to assist physically disabled and immobilized people through facial expression is a challenging area of research and has attracted many researchers recently. In this paper, luminance stickers based facial expression recognition is proposed. Recognition of facial expression is carried out by employing Discrete Wavelet Transform (DWT) as a feature extraction method. Different wavelet families with their different orders (db1 to db20, Coif1 to Coif 5 and Sym2 to Sym8) are utilized to investigate their performance in recognizing facial expression and to evaluate their computational time. Standard deviation is computed for the coefficients of first level of wavelet decomposition for every order of wavelet family. This standard deviation is used to form a set of feature vectors for classification. In this study, conventional validation and cross validation are performed to evaluate the efficiency of the suggested feature vectors. Three different classifiers namely Artificial Neural Network (ANN), k-Nearest Neighborhood (kNN) and Linear Discriminant Analysis (LDA) are used to classify a set of eight facial expressions. The experimental results demonstrate that the proposed method gives very promising classification accuracies.