KSVD-SVM Approach for Spontaneous Facial Expression Recognition

Authors : Dawood Al Chanti, Alice Caplier

Abstract : Sparse representations of signals have received a great deal of attention in recent years. In this paper, the interest of using sparse representation as a mean for performing sparse discriminative analysis between spontaneous facial expressions is demonstrated. An automatic facial expressions recognition system is presented. It uses a KSVD-SVM approach which is made of three main stages: A pre-processing and feature extraction stage, which solves the problem of shared subspace distribution based on the random projection theory, to obtain low dimensional discriminative and reconstructive features; A dictionary learning and sparse coding stage, which uses the KSVD model to learn discriminative under or over dictionaries for sparse coding; Finally a classification stage, which uses a SVM classifier for facial expressions recognition. Our main concern is to be able to recognize non-basic affective states and non-acted expressions. Extensive experiments on the JAFFE static acted facial expressions database but also on the DynEmo dynamic spontaneous facial expressions database exhibit very good recognition rates.

Keywords : dictionary learning, random projection, pose and spontaneous facial expression, sparse representation