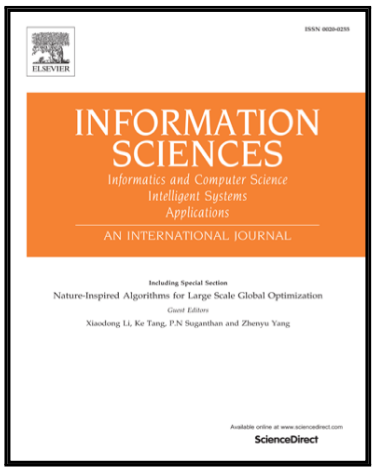

Exemplar-based facial expression recognition

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Exemplar-based facial expression recognition

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Abstract

Facial expressions exhibit very important and judgmental information regarding our emotions and feelings. They show our true intentions to audiences and help them to interpret what we really do mean. Thus, developing such an automatic facial expression system to facilitate the human-machine interaction is of much interest. So far, many algorithms have been proposed to recognize facial expressions that basically employ a complex model to find an answer to the following question: "[to] which expressions' category does this sample belong"? Instead, we propose to build a pool of simple models that are employed together to find an answer to an even simpler question, which is as follows: "which known emotion is this sample similar to"? In this way, we are trying to find the most similarly perceived (*a prior* knowledge) emotion among the other emotions so far. The most interesting advantage of this method is to employ the extra available knowledge of the pre-perceived emotions that have been provided by experts over time. Another advantage is to avoid the categorization of expressions in advance, which yield a more general system. The performance of our facial expression system is evaluated on five publicly available facial expression datasets; these are CK, CK+, JAFFE, TFEID, and MMI. The results of the experiments show that our system achieves high recognition accuracy, and the comparison of its performance with the state-of-the art algorithms indicates that the proposed system is highly desirable among competitors.

Keywords: Facial Expression, Emotion, Classification, Deep Learning, Support Vector Machine, Exemplar, Histogram of Oriented Gradient, Engineered representation, Learnt representation