Enhanced feature selections of Adaboost training for face detection using genetic algorithm

Authors : Zin, Zalhan Mohd and Khalid, Marzuki and Yusof, Rubiyah (2007)

Abstract

A wide variety of face detection techniques have been proposed over the past decades. Generally, a large number of features are required to be selected for training purposes. Often some of these features are irrelevant and do not contribute directly to the face detection techniques. This creates unnecessary computation and usage of large memory space. In this thesis, features search space has been enlarged by enriching it with seven additional new feature types. With these new feature types and larger search space, Genetic Algorithm (GA) is used within the Adaboost framework, to find sets of features which can provide a better cascade of boosted classifiers with a shorter training time. This technique is referred to as GABoost for this training part of a face detection system. The GA carries out an evolutionary search to select features which results in a higher number of feature types and sets selected in less time. Experiments on a set of images from BioID face database proved that by using GA to search on a large number of feature types and sets, the proposed technique referred to as GABoost was able to obtain the cascades of boosted classifiers for the face detection system that can give higher detection rates (94.25%), lower false positive rates (55.94%) and less training time (6.68 hours).