Fuzzy clustering for genetic algorithm based optimized ellipse data in classifying face emotion

Abstract

In this paper, lip and eye features are applied to classify the human emotion using a set of irregular and regular ellipse fitting equations using genetic algorithm (GA). A South East Asian face is considered in this study. The parameters relating the face emotions, in either case, are entirely different. All six universally accepted emotions and one neutral are considered for classifications. The method which is fastest in extracting lip and eye features is adopted in this study. Observation of various emotions of the subject lead to unique characteristic of lips and eyes. GA is adopted to optimize irregular ellipse characteristics of the lip and eye features in each emotion. That is, the top portion of lip configuration is a part of one ellipse and the bottom of different ellipse. Two ellipse based fitness equations are proposed for the lip configuration and relevant parameters that define the emotions are listed. One ellipse based fitness function is proposed for the eye configuration. The GA method has achieved reasonably successful classification of emotion. In some emotions classification, optimized data values of one emotion are messed or overlapped to other emotion ranges. In order to overcome the overlapping problem between the emotion optimized values and at the same time to improve the classification, a fuzzy clustering method (FCM) of approach has been implemented to offer better classification. The GA-FCM approach offers a reasonably good classification within the ranges of clusters.