

DEVELOPMENT OF A PERSONIFIED FACE EMOTION RECOGNITION TECHNIQUE USING FITNESS FUNCTION

Abstract:

In this article, two subjects, one South East Asian (SEA) and the other Japanese, are considered for face emotion recognition using a genetic algorithm (GA). The parameters relating the face emotions in each case are entirely different. All six universally accepted emotions and one neutral are considered for each subject. Eyes and lips are usually considered as the features for recognizing emotions. This paper has two parts. The first part investigates a set of image processing methods suitable for recognizing face emotion. The acquired images have gone through a few preprocessing methods such as gray-scale, histogram equalization, and filtering. The edge detection has to be sufficiently successful even when the light intensity is uneven. So, to overcome this problem, the histogram-equalized image has been split into two regions of interest (ROI): the eye and lip regions. The two regions have been applied with the same preprocessing methods, but with different threshold values. It was found that the Sobel edge detection method performed very well in segmenting the image. Three feature extraction methods are considered, and their respective performances are compared. The method which is fastest in extracting eye features is adopted. The second part of the paper discusses the way to recognize emotions from eye features alone. Observation of various emotions of the two subjects lead to a unique eye characteristic, that is, the eye exhibits ellipses of different parameters in each emotion. The GA is adopted to optimize the ellipse characteristics of the eye features in each emotion based on an ellipse-based fitness function. This has shown successful emotion classifications, and a comparison is made on the emotions of each subject.