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Developing an advanced System for emotion detection based on brain signals and facial

Abstract

Introduction: According to role of emotions in human's life, if they can be recognized contemporary with facial expression by EEG signals, it can discriminate between real abd artificial emotions. This ability can be applied in lie detector and be also helpful to patients that able to feel emotions but can't show it with facial expression.

Methods: In this study, some emotion induction experiments were designed. But due to lack of emotion induction tools for doing such a research at Iranian culture, in addition to recognizing emotions, the second goal was to collect an emotion induction anthology or collection based on Iranian culture. To achieve these goals, 24 subjects including 16 males and 8 famales were under study by International Affective Picture System (IAPS) and movies with Iranian culture.

Results: After reviewing various methods, fractal dimension and the AdaBoost classifier were selected as the best methods. 92% average accuracy was achieved from movies with Iranian culture and 79.6% average accracy was achieved for removing confounding effect of gender difference, emotion recognition was not performed separately for males and females and both sexes were included.

Conclusion: Despite gender differences in participants; the results show that recognition methods are very strong. Also the results show that culturally related movies get higher accuracy in comparison with IAPS. So using EEG signals along and concomitant by facial

expressions can solve the problem of hiding emotions from facial images.