Affective recognition from EEG signals: an integrated data-mining approach

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Abstract

Emotions play an important role in human communication, interaction, and decision making processes. Therefore, considerable efforts have been made towards the automatic identification of human emotions, in particular electroencephalogram (EEG) signals and Data Mining (DM) techniques have been then used to create models recognizing the affective states of users. However, most previous works have used clinical grade EEG systems with at least 32 electrodes. These systems are expensive and cumbersome, and therefore unsuitable for usage during normal daily activities. Smaller EEG headsets such as the Emotiv are now available and can be used during daily activities. This paper investigates the accuracy and applicability of previous affective recognition methods on data collected with an Emotiv headset while participants used a personal computer to fulfill several tasks. Several features were extracted from four channels only (AF3, AF4, F3 and F4 in accordance with the 10–20 system). Both Support Vector Machine and Naïve Bayes were used for emotion classification. Results demonstrate that such methods can be used to accurately detect emotions using a small EEG headset during a normal daily activity.

keywords

Affective computing, Affective recognition, Data Mining (DM), Electroencephalogram (EEG), Statistical features