Human emotion classifications for automotive driver using skin conductance response signal

ABSTRACT

Risky driving, speeding, and fatigue are the main causes of traffic accidents in Malaysia. Risky driving is an attitude associated with human states of emotion. Emotions detected using facial and body movements, sounds and physiological changes which required multiple and bulky instruments such as camera, voice recorder and sensors. In this study, skin conductance response (SCR) was investigated to overcome these drawback. The main goal of this study is to recognize human emotions by using a nonintrusive sensor and low-design-complexity protocols. Five emotions, namely, happiness, sadness, disgust, fear, and anger, were identified to have a close relationship with risky driving. The emotions were elicited by using image, video-audio, and video stimulus techniques and 960 Hz raw signal sampling rate was recorded. The video clip stimulus method showed 95.7% efficacy in detecting happiness and anger. The affective assessment classification rate obtained from SCR processing was more than 70% accuracy based on the off-line support vector machine classifier-processing algorithm. Overall results confirmed that the SCR signal should be considered in the future as one of the physiological signals in automated real-time emotions recognition systems.