A comparative investigation of eye fixation-based 4-class emotion recognition in virtual reality using machine learning

ABSTRACT

Research on emotion recognition that relies purely on eye-tracking data is very limited although the usability of eye-tracking technology has great potential for emotional recognition. This paper proposes a novel approach for 4-class emotion classification using eye-tracking data solely in virtual reality (VR) with machine learning algorithms. We classify emotions into four specific classes using VR stimulus. Eye fixation data was used as the emotional-relevant feature in this investigation. A presentation of 360 0 videos, which contains four different sessions, was played in VR to evoke the user's emotions. The eye-tracking data was collected and recorded using an add-on eye-tracker in the VR headset. Three classifiers were used in the experiment, which are k-nearest neighbor (KNN), random forest (RF), and support vector machine (SVM). The findings showed that RF has the best performance among the classifiers, and achieved the highest accuracy of 80.55%.