

An Ensemble Method for Fatigue Detection based on Multiple Facial Expressions

Niranjan V.* , Nadarajah S., Thavayoganathan A., and Vijayanathan S.

Department of Information and Communication Technology, Faculty of Technological Studies, University of Vavuniya, Sri Lanka.

* *svenuja@vau.ac.lk*

People who spend a lot of time staring at screens need to be aware of their own level of fatigue because it can lower productivity and increase the risk of accidents. This study suggests a novel method for detecting fatigue based on a variety of facial expressions. 12,185 facial images of people were collected using digital screens, which contain 6108 normal face images and 6077 stress face images. In this framework, different multiple facial expressions techniques and Artificial Neural Network (ANN) were used to label neutral faces as normal, while sad and disgusted faces were labelled as stressed. This dataset was used to train a deep learning model to classify facial images as normal or stressful. The model achieved highest accuracy rates of 88% for testing and showed good performance on a trained dataset. The study validated the accuracy of the selected approach by comparing the predicted stress/non-stress labels with ground truth labels obtained through self-report. The results of this study demonstrate the potential of using multiple facial expressions for fatigue detection in people who are using digital screens. This approach could be used in the future to develop real-time fatigue detection systems that could alert people when they are showing signs of stress or fatigue and help them take a break or adjust their work schedule.

Keywords: Classification, Deep learning, Facial expressions, Fatigue, Image processing