

Drowsiness Recognition Using the Least Correlated LBPH

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Abstract

In recent years, the drowsiness detection is widely applied to the driver alerting or distance learning. The drowsiness recognition system is constructed on the basis of the recognition of eye states. The conventional methods for recognizing the eye states are often influenced by the illumination variations or hair/glasses occlusion. In this project, we propose a new image feature called “least correlated LBP histogram (LC-LBPH)” to generate a high discriminate image features for establishing a robust eye states recognition system. Then, the method of independent component analysis (ICA) is used to derive the low-dimensional and statistical independent feature vectors. Finally, support vector machines (SVM) is trained to identify the eye states. Furthermore, we design four rules to recognize three eye transition patterns which define the normal (consciousness), drowsiness, and sleeping situations. Experimental results show that the eye-state recognition rate is about 0.08 seconds per frame and the drowsiness recognition accuracy approaches 98%.

Keyword : drowsiness recognition, eye state, LC-LBPH, ICA, support vector machine