博士论坛

基于ICA和HMM的疲劳驾驶眼部状态识别算法

杨秋芬[1], 桂卫华[1], 胡豁生[2], 周书仁[1]

1.中南大学 信息科学与工程学院，长沙 410083
2.英国Essex大学 计算机科学系，英国

摘要　　汽车司机疲劳驾驶是引发交通事故的一个重要原因。驾驶员在正常驾驶、瞌睡驾驶及疲劳驾驶3种状态下的眼睛张开程度有一定的区别。提出了一种ICA结合隐马尔可夫模型（HMM）识别眼部状态的识别算法，首先对彩色图像进行二值化处理，然后利用ICA算法进行眼部状态特征提取，为了加快特征提取的速度，这里采用FastICA算法；然后通过HMM进行眼部状态识别。实验结果表明，该算法可快速有效地识别出驾驶员眼部状态。

关键词　　疲劳驾驶　眼部状态识别　独立元分析　隐马尔可夫模型

分类号

Eyes＇ states recognition algorithm for fatigue driving based on ICA and HMM

YANG Qiu-fen[1],GUI Wei-hua[1],HU Huo-sheng[2],ZHOU Shu-ren[1]

1.School of Information Science and Engineering，Central South University，Changsha 410083，China
2.Department of Computer Science，University of Essex，United Kingdom

Abstract

  Driving in case of drowse is a most important factor of traffic accidents.Under the circumstances of the natural driving, drowsing driving and fatigued driving of a driver，the opening degrees of the eyes are different to some extent.This paper proposes a recognition algorithm to the eyes＇ states based on ICA and Hidden Markov Model（HMM）.The original image is used to get edge grayscale image and edge grayscale enhanced image.Secondly，it is applied to extraction of eye state features using ICA algorithm，in this process it adopts FastICA algorithm in order to increase the speed of feature extraction.Finally，it is applied to recognizing eye state using HMM algorithm.Experimental results show that the system increases the whole effect and accuracy of eye state recognition，and prove that the algorithm is efficient and feasible.

Key words　fatigue driving　eye states recognition　Independent Component Analysis（ICA）　Hidden Markov Model（HMM）

通讯作者　杨秋芬 yqf5569@sohu.com

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