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| Title | Vision-based On-Road Nighttime Vehicle Detection and Tracking Using Taillight and Headlight Features | | |
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| Abstract |  |
| An important and challenging aspect of developing an intelligent transportation system is the identification of nighttime vehicles. Most accidents occur at night owing to the absence of night lighting conditions. Vehicle detection has become a vital subject for research to ensure safety and avoid accidents. New vision-based on-road nighttime vehicle detection and tracking system are suggested in this survey paper using taillight and headlight features. Using computer vision and some image processing techniques, the proposed system can identify vehicles based on taillight and headlight features. For vehicle tracking, a centroid tracking algorithm has been used. Euclidean Distance method has been used for measuring the distances between two neighboring objects and tracks the nearest neighbor. In the proposed system two flexible fixed Region of Interest (ROI) have been used, one is the Headlight ROI, and another is the Taillight ROI that could adapt to different resolutions of the images and videos. The achievement of this research work is that the proposed two ROIs can work simultaneously in a frame to identify oncoming and preceding vehicles at night. The segmentation techniques and double thresholding method have been used to extract the red and white components from the scene to identify the vehicle headlights and taillights. To evaluate the capability of the proposed process, two types of datasets have been used. Experimental findings indicate that the performance of the proposed technique is reliable and effective in distinct nighttime environments for detection and tracking of vehicles. The proposed method has been able to detect and track double lights as well as single light such as motorcycle light and achieved average accuracy and average processing time of vehicle detection about 97.22% and 0.01 s per frame respectively. | |