Vehicle Speed Estimation Using Image Processing

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Abstract : In India, the smart city concept is growing day by day. So, for smart city development, a better traffic management and monitoring system is a very important requirement. Nowadays, road accidents increase due to more vehicles on the road. Reckless driving is mainly responsible for a huge number of accidents. So, an efficient traffic management system is required for all kinds of roads to control the traffic speed. The speed limit varies from road to road basis. Previously, there was a radar system but due to high cost and less precision, the radar system is unable to become favorable in a traffic management system. Traffic management system faces different types of problems every day and it has become a researchable topic on how to solve this problem. This paper proposed a computer vision and machine learning-based automated system for multiple vehicle detection, tracking, and speed estimation of vehicles using image processing. Detection of vehicles and estimating their speed from a real-time video is tough work to do. The objective of this paper is to detect vehicles and estimate their speed as accurately as possible. So for this, a real-time video is first captured, then the frames are extracted from that video, then from that frames, the vehicles are detected, and thereafter, the tracking of vehicles starts, and finally, the speed of the moving vehicles is estimated. The goal of this method is to develop a cost-friendly system that can able to detect multiple types of vehicles at the same time.

Keywords : OpenCV, Haar Cascade classifier, DLIB, YOLOV3, centroid tracker, vehicle detection, vehicle tracking, vehicle speed estimation, computer vision
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