

The Use of Lane-Centering to Assure the Visible Light Communication Connectivity for a Platoon of Autonomous Vehicles

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Abstract : The new emerging Visible Light Communication (VLC) technology has been subjected to intensive investigation, evaluation, and lately, deployed in the context of convoy-based applications for Intelligent Transportations Systems (ITS). The technology limitations were defined and supported by different solutions proposals to enhance the crucial alignment and mobility limitations. In this paper, we propose the incorporation of VLC technology and Lane-Centering (LC) technique to assure the VLC-connectivity by keeping the autonomous vehicle aligned to the lane center using vision-based lane detection in a convoy-based formation. Such combination can ensure the optical communication connectivity with a lateral error less than 30 cm. As soon as the road lanes are detectable, the evaluated system showed stable behavior independently from the inter-vehicle distances and without the need for any exchanged information of the remote vehicles. The evaluation of the proposed system is verified using VLC prototype and an empirical result of LC running application over 60 km in Madrid M40 highway.

Keywords : visible light communication, lane-centerin, platooning, intelligent transportation systems, road safety applications

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