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Enhancing Connectivity of Autonomous Vehicles: A review of Vehicular Ad-hoc Networks (VANET)

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Abstract

This study examines relevant literature on vehicular ad hoc networks (VANET) utilized for autonomous vehicle communications (AVs). A literature search was performed to gain more knowledge about AVs and VANET, and journal articles were examined to gather information to determine the challenges and solutions. This paper aims to study vulnerabilities and the future direction of VANET using 6G to identify the current state of AVs. The defined challenges were examined through peer-reviewed research articles and show the cause of issues is from the huge transmission, which may lead to a communication failure. The most practical option will be chosen after comparing the characteristics of the promising and potential solutions, which include Blockchain, Hybrid RF-VLC V2X Systems, Large Scale Non-Orthogonal Multiple Access (NOMA), Integrated Computing, and ML-aided V2X. The defined solutions are emerging technologies that need further studies and are all examined to identify their abilities as solutions to the challenges. In order to highlight the most viable solution to the defined challenges, a comparison was performed. This study will contribute to the knowledge of autonomous vehicles in 6 G-based VANET to enable vehicle-to-everything (V2X) by classifying their challenges and existing or possible solutions to answer the research gap and questions.

Keywords: Autonomous Vehicle, VANET, 6G-V2X, Blockchain, Hybrid RF-VLC V2X Systems, Large Scale Non-Orthogonal Multiple Access (NOMA), Integrated Computing, and ML-aided V2X