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Real-Time V2V Communication for Traffic Optimization and Collision Prevention Using Machine Learning.

MEJ Prasanna[1#], WMSRB Wijayarathna[2], and RMM Pradeep[3]

[1,2,3]Department of Information Technology, Faculty of Computing, General Sir John Kotelawala Defence University

[#]39-bit-0029@kdu.ac.lk

Abstract

Vehicle-to-vehicle(V2V) communication represent a critical of next generation transportation systems. This paper explores how to improve V2V systems through the integration of V2X, using machine learning models, and blockchain-based security techniques, bringing greater road safety and traffic management optimization. Leveraging cellular Vehicle-to-Everything (C-V2X) technology, the proposed system offers enhanced capability in range, scalability, and low-latency communication, making it highly suitable for high-speed mobility scenarios. Furthermore, the study provides insights into the works of power transfer, providing discussions on how electric vehicles would be able to share power and data in real time. The paper also examines the role of machine learning algorithms, particularly Deep Reinforcement Learning (DRL) and transformer-based models, in enhancing the efficiency, safety, and data security of V2V systems. Special emphasis is placed on the implications of these technologies for autonomous vehicle systems. By addressing key challenges and proposing innovative solutions, this research contributes to the advancement of intelligent and secure transportation networks.

Keywords: *Vehicle-to-Vehicle Communication (V2V), Vehicle-to-Everything (V2X), Cellular Vehicle-to-Everything(C-V2X), Deep Reinforcement Learning (DRL).*