

23-24 Oct 2021

Enhancing Security in Internet of Vehicles (Iov) With Lightweight Blockchain-Based Solutions: A Programme

Aravendra Kumar Sharma, PhD in Computer science, Sunrise University, Alwar

Abstract

The rapid development of the Internet of Vehicles (IoV) has enabled intelligent transportation systems by facilitating communication among vehicles, roadside infrastructure, cloud platforms, and other connected devices. However, the highly distributed and dynamic nature of IoV networks creates significant security and privacy challenges, including unauthorized access, data manipulation, identity theft, malicious attacks, and single points of failure. Conventional centralized security mechanisms may not adequately address these challenges because of their dependence on trusted intermediaries and their computational and communication limitations. This study explores a lightweight blockchain-based approach for enhancing security in IoV environments. Blockchain technology can provide decentralized trust, data integrity, traceability, and tamper resistance while reducing dependence on centralized authorities. The proposed programme focuses on designing an efficient and lightweight blockchain framework suitable for resource-constrained vehicular environments. It considers mechanisms such as lightweight consensus, secure authentication, privacy-preserving identity management, and efficient transaction validation to minimize computational, storage, and communication overhead. The study further examines how smart contracts can support automated security policies and trusted interactions among vehicles and infrastructure. The proposed approach aims to strengthen the confidentiality, integrity, authenticity, and availability of vehicular data while maintaining efficient network performance. The research contributes to the development of secure and scalable IoV architectures by integrating blockchain with lightweight security mechanisms. The findings may support the development of trustworthy intelligent transportation systems and provide a foundation for future research in secure connected and autonomous vehicles.

Keywords: Internet of Vehicles, IoV Security, Blockchain, Lightweight Blockchain, Cybersecurity, Authentication, Data Integrity, Privacy, Smart Contracts, Intelligent Transportation Systems.