

ABSTRACT FOR AI-ENABLED BLOCKCHAIN CONSENSUS NODE SELECTION IN CLUSTER-BASED VEHICULAR NETWORKS

ABSTRACT:

The convergence of Artificial Intelligence (AI) and Blockchain technology presents a novel approach to enhance the efficiency and reliability of consensus node selection in cluster-based vehicular networks. This abstract explores the development and application of an AI-enabled framework designed to optimize the selection process of consensus nodes within these networks. Cluster-based vehicular networks leverage Blockchain technology to facilitate secure and transparent transactions among vehicles and infrastructure. The selection of consensus nodes, responsible for validating transactions and maintaining network integrity, is critical to ensuring the system's robustness and scalability. The proposed AI-enabled framework employs machine learning algorithms to dynamically analyze vehicular data, traffic patterns, and network conditions. By considering factors such as vehicle density, proximity, and communication reliability, the framework autonomously identifies optimal consensus nodes capable of efficiently managing transaction validation tasks within each cluster. Key functionalities include real-time adaptation to changing network dynamics, proactive node selection based on predictive analytics, and integration with Blockchain protocols to ensure consensus algorithm compliance. Privacy-preserving techniques and cryptographic mechanisms are implemented to safeguard data integrity and user confidentiality in vehicular communications. Research indicates that AI-enabled Blockchain consensus node selection can significantly enhance network performance, reduce latency in transaction processing, and mitigate risks associated with centralized control. Challenges such as algorithm validation, scalability, and regulatory compliance are also addressed within the framework. In conclusion, the integration of AI and Blockchain technologies offers a promising solution to optimize consensus node selection in cluster-based vehicular networks, paving the way for enhanced reliability, scalability, and security in future smart mobility ecosystems. Further research and validation are essential to fully harness the potential of this innovative approach in real-world deployments.