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Routing Optimization in the Internet of Vehicle: A Systematic Review

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Abstract

The Internet of Vehicles (IoV) represents a novel concept in vehicle communication, seamlessly integrating cloud computing, the Internet of Things (IoT), and Vehicular Ad-hoc Networks (VANETs). Its popularity has been steadily rising, offering innovative solutions for efficient transportation management. Within a dynamic system replete with moving vehicles, addressing routing problems and related challenges is imperative. Optimal routes necessitate collective decision-making, considering the entire network rather than individual routes. Tackling this complexity, the adoption of optimization techniques becomes pivotal in seeking optimal solutions for intricate issues. This paper undertakes a comprehensive review and discussion of diverse optimization methods applicable to IoV routing protocols. © 2024 IEEE.

Author Keywords

Internet of Vehicles (IoV); Optimization technique; Routing Protocol

Index Keywords

Decision making, Internet of things, Routing protocols, Vehicle to vehicle communications, Vehicular ad hoc networks; Cloud-computing, In-vehicle communication, Innovative solutions, Internet of vehicle, Novel concept, Optimization techniques, Routing optimization, Routing-protocol, Systematic Review, Vehicular Adhoc Networks (VANETs); Vehicles

References

- Ahmed, Z.E.
Optimization Procedure for Intelligent IoT Applications
(2022) *IEEE 2022 ICBATS*, pp. 1-6.
- Ahmed, Z.E.
Energy optimization in low-power wide area networks by using heuristic techniques
(2020) *LPWAN Technologies for IoT and M2M Applications*, pp. 199-223.
Academic Press.
- Saeed, R.A.
Energy Efficient Path Planning Scheme for Unmanned Aerial Vehicle using Hybrid Generic Algorithm Based QLearning Optimization
IEEE Access,
- Anatabine, L.E.
Deep and Reinforcement Learning Technologies on Internet of Vehicle (IoV) Applications: Current Issues and Future Trends
(2022) *Journal of Advanced Transportation*, 2022, p. 16.
- Khalifa, O.O.
Vehicle Detection for Vision-Based Intelligent Transportation Systems Using Convolutional Neural Network Algorithm
(2022) *Jour. of Adv. Transp.*, 2022, p. 11.
- Elfatih, N.M., Mohammad
Internet of vehicle's resource management in 5G networks using AI technologies:

Current status and trends

(2021) *IET Commun.*, pp. 1-21.

- Elaryh, M.
An optimized link state routing protocol for real-time application over Vehicular Ad-hoc Network
(2021) *Alexandria Eng. Jour.*, 61 (6).
- Ali, E.S.
Machine Learning Technologies for Secure Vehicular Communication in Internet of Vehicles: Recent Advances and Applications
(2021) *Wiley-Hindawi, Jour. of Security and Comm. Net. (SCN)*, 2021.
- Abdelgadir, M.
Evaluation of Performance Enhancement of OFDM Based on Cross Layer Design (CLD) IEEE 802. 11p Standard for Vehicular Ad-hoc Networks (VANETs), City Scenario
(2020) *Intern. Jou. of Signal Processing Systems*, 8 (1), pp. 1-7.
- Abdelgadir, M.
Cross Layer Design Approach for Efficient Data Delivery Based on IEEE 802. 11P in Vehicular Ad-Hoc Networks (VANETS) for City Scenarios
(2018) *Inter. Journ. on Ad Hoc Net. Sys (IJANS)*, 8 (4).
- Abdelgadir, M.
Mobility Routing Model for Vehicular Ad-hoc Networks (VANETs), Smart City Scenarios
(2017) *Veh. Comms*, 9, pp. 154-161.
- Eltahir, A.A.
Evaluation and Analysis of an Enhanced Hybrid Wireless Mesh Protocol for Vehicular Ad-hoc Network
(2016) *EURASIP Jour. on Wirel. Comm. And Net.*, (1), pp. 1-11.
- Alawi, M.A.
(2014) *Simplified gateway selection scheme for multi-hop relay vehicular ad hoc network*, 27 (12), pp. 3855-3873.
John Wiley & Sons, Ltd, Intern. Jour. of Comm. Systems
- Amal, E.A.
An enhanced hybrid wireless mesh protocol (EHWMP) protocol for multihop vehicular communications
(2013) *2013 IEEE ICCEEE*, pp. 1-8.
- Alawi, M.
Internet Access Challenges and Solutions for Vehicular Ad-Hoc Network Environment
(2012) *IEEE ICCCE2012*,
- Saeed, R.A.
Design and evaluation of lightweight IEEE 802. 11pbased TDMA MAC method for road side-to-vehicle communications
(2010) *IEEE, ICACT'10 Proceedings of the 12th ICACT*, pp. 1483-1488.
Korea April
- Khalifa, O.O.
An IoT-Platform-Based Deep Learning System for Human Behavior Recognition in Smart City Monitoring Using the Berkeley MHAD Datasets
(2022) *Systems*, 10, p. 177.

- Mukhtar, A.M.
Performance Evaluation of Downlink Coordinated Multipoint Joint Transmission under Heavy IoT Traffic Load
(2022) *Wireless Communications and Mobile Computing*, 2022, p. 16.
- Alnazir, A.
Quality of Services Based on Intelligent IoT WLAN MAC Protocol Dynamic Real-Time Applications in Smart Cities
(2021) *Computational Intelligence and Neuroscience*, 2021, p. 20.
- Ghorpade, S.N.
A Novel Enhanced Quantum PSO for Optimal Network Configuration in Heterogeneous Industrial IoT
(2021) *IEEE Access*, 9, pp. 134022-134036.
- Ghorpade, S.N.
Enhanced Differential Crossover and Quantum Particle Swarm Optimization for IoT Applications
(2021) *IEEE Access*, 9, pp. 93831-93846.
- Hassan, M.B.
An Enhanced Cooperative Communication Scheme for Physical Uplink Shared Channel in NB-IoT
(2021) *Wireless Pers Commun*, 120, pp. 2367-2386.
- Nur, N.
A Systematic Review on Cognitive Radio in Low Power Wide Area Network for Industrial IoT Applications
(2021) *MDPI, Sustainability*,
- Lamouik, I.
Deep neural network dynamic traffic routing system for vehicles
(2018) *2018 IEEE ISCV*, pp. 1-4.
- Liao, X.
An Optimal Packet Delivery Strategy Based on Deep Reinforcement Learning in IoV
(2021) *2021 IEEE UCET*, pp. 146-151.
- Sahraoui, Y.
Deepdist: A deep-learning-based iov framework for real-time objects and distance violation detection
(2020) *IEEE IoTMagazine*, 3 (3), pp. 30-34.
- Kumbhar, F.H.
Novel Vehicular Compatibility-Based Ad Hoc Message Routing Scheme in the Internet of Vehicles Using Machine Learning
(2022) *IEEE IoTJr.*, 9 (4), pp. 2817-2828.
15
- Ji, B.
Research on optimal intelligent routing algorithm for IoV with machine learning and smart contract
(2023) *Digital Communications and Networks*, 9 (1), pp. 47-55.
- Nayak, R.P.
MI-MDS: Machine learning based misbehavior detection system for cognitive software-defined multimedia vanets (csdmv) in smart cities
(2022) *Multimedia Tools and Applications*, pp. 1-21.
- Zhang, D.G.
A new method of content distribution based on fuzzy logic and coalition graph

- games for VEC**
(2022) *Cluster Computing*, pp. 1-17.
- Fahad, T.O.
Compressed fuzzy logic based multi-criteria AODV routing in VANET environment
(2019) *Intern. Jr. of Elect. And Comp. Eng.*, 9 (1), p. 397.
 - Alzamzami, O.
Fuzzy logic-based geographic routing for urban vehicular networks using link quality and achievable throughput estimations
(2018) *IEEE Trans. on Intelligent Transpor. Sys*, 20 (6), pp. 2289-2300.
 - Chowdhary, N.
Increasing route availability in the internet of vehicles using ant colony optimization
(2017) *ICA/CR*, pp. 318-331.
Springer, Singapore.
 - Nguyen, T.H.
ACO-based approach on dynamic MSMD routing in IoV environment
(2020) *2020 IEEE 16th IE*, pp. 68-73.
 - Zhao, H.T.
Ant Colony Optimization Based Dynamic Scheduling Routing Algorithm on the Internet of Vehicles
(2019) *2019 IEEE ICCETW*, pp. 1-2.
 - Dhanare, R.
Enhancing the route optimization using hybrid MAF optimization algorithm for the internetvehiclesicle
(2022) *Wirel. Perso. Comm*, pp. 1-21.
 - Islam, M.A.
Hybrid particle swarm optimization algorithm for solving the clustered vehicle routing problem
(2021) *Applied Soft Computing*, 110, p. 107655.
 - Attia, R.
Advanced greedy hybrid bio-inspired routing protocol to improve IoV
(2021) *IEEE Access*, 9, pp. 131260-131272.
 - Omar, N.
Design and development of GreedLea routing protocol for Internet of Vehicles (IoV)
(2020) *IOP Conference Series: Materials Sci. And Eng.*, 767 (1), p. 12034.
IOP Publishing.
 - Xu, H.
A hybrid ant colony optimization for dynamic multidepot vehicle routing problem
(2018) *Discrete Dynamics in Nature and Society*,
 - Mershad, K.
Utilizing Roadside Units and Software Defined Networking to Route Packets Efficiently in Internet of Vehicles
(2020) *2020 17th IEEE AICCSA*, pp. 1-8.
 - Wang, C.
SDCoR: Software defined cognitive routing for internet of vehicles
(2018) *IEEE IoT Jr.*, 5 (5), pp. 3513-3520.
 - Kadhim, A.J.
Routing protocol for IoV-Fog network supported by SDN
(2020) *Telecommunications and Radio Eng.*, 79 (5).

- Lu, T.
Fog computing enabling geographic routing for urban area vehicular network
(2018) *Peer-to-Peer Networking and Applications*, 11 (4), pp. 749-755.
- Darwish, T.S.
Fog based intelligent transportation big data analytics in the internet of vehicles environment: Motivations, architecture, challenges, and critical issues
(2018) *IEEE Access*, 6, pp. 15679-15701.
- Zhang, D.
A new algorithm of clustering AODV based on edge computing strategy in IOV
(2021) *Wireless Networks*, 27 (4), pp. 2891-2908.

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