

Optimization of IoT Network Security Protocols in Smart Cities Using Metaheuristic-Based Machine Learning

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Abstract:

The proliferation of IoT devices in smart cities introduces significant security challenges, particularly in safeguarding sensitive data and ensuring reliable communication. This study proposes a hybrid framework that integrates metaheuristic algorithms with machine learning models to optimize IoT network security protocols in urban environments. The framework utilizes real-time network traffic data to detect anomalies, predict vulnerabilities, and adapt security policies dynamically. Metaheuristic techniques such as Genetic Algorithms (GA), Ant Colony Optimization (ACO), and Particle Swarm Optimization (PSO) are employed to fine-tune machine learning parameters for intrusion detection models, including decision trees, support vector machines (SVM), and neural networks. The proposed system demonstrates high detection accuracy and reduced false positives while maintaining computational efficiency, thereby enhancing the resilience of smart city infrastructures against cyber threats.

Keywords:

IoT security, smart cities, metaheuristic algorithms, machine learning, intrusion detection, network optimization.

REQUEST FOR FULL TEXT

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