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Optimization of IoT Network Security in Smart Cities Through Deep Learning Algorithms and Metaheuristics

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Abstract:

As smart cities increasingly rely on IoT networks for various urban applications, ensuring the security of these networks has become a critical challenge. This study proposes an innovative approach to enhance IoT network security in smart cities using deep learning algorithms and metaheuristics. By analyzing network traffic data from IoT devices, deep learning models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) are used to detect anomalies, potential security threats, and intrusions in real-time. In addition, metaheuristic algorithms like Genetic Algorithms (GA) and Particle Swarm Optimization (PSO) are applied to optimize network configurations, improving the overall defense mechanism of the system. The framework provides proactive security measures, such as dynamic threat detection and response strategies, ensuring the integrity and resilience of IoT systems in smart cities. Experimental results show that the proposed model significantly enhances detection accuracy and minimizes false positives, making it a robust solution for securing IoT networks.

Keywords:

IoT security, smart cities, deep learning, metaheuristics, anomaly detection, network optimization.

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