International Journal of Computer Science and Engineering (IJCSE)
ISSN (P): 2278–9960; ISSN (E): 2278–9979
Vol. 12, Issue 2, Jul–Dec 2023; 195–218
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International Academy of Science, Engineering and Technology
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REAL-TIME ANOMALY DETECTION USING DBSCAN CLUSTERING IN CLOUD NETWORK INFRASTRUCTURES

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ABSTRACT

In the era of cloud computing, ensuring the security and reliability of network infrastructures is paramount. This study presents a novel approach for real-time anomaly detection using the Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithm, tailored specifically for cloud network environments. Traditional anomaly detection methods often struggle with high-dimensional data and varying data distributions typical of cloud infrastructures. By leveraging DBSCAN's ability to identify clusters of varying shapes and sizes while effectively handling noise, this research aims to enhance the detection of irregular patterns that may signify potential security threats or performance issues. The proposed system continuously monitors network traffic, applying DBSCAN to dynamically cluster data points and flag anomalies based on density variations. Preliminary results indicate a significant improvement in detection rates compared to conventional methods, showcasing the efficacy of DBSCAN in real-time scenarios. This research contributes to the ongoing development of robust security frameworks for cloud networks, facilitating proactive responses to anomalies and enhancing overall system integrity.

KEYWORDS: *Real-Time Anomaly Detection, DBSCAN Clustering, Cloud Network Infrastructures, Security Threats, Performance Monitoring, High-Dimensional Data, Noise Handling, Density-Based Clustering, Network Traffic Analysis, Proactive Security Frameworks*

Article History

Received: 15 Oct 2023 | Revised: 20 Oct 2023 | Accepted: 25 Oct 2023