Leveraging Data Mining for Cybersecurity Threat Detection

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Abstract:
In the face of increasingly sophisticated cyber threats, the application of data mining techniques has become essential for effective cybersecurity threat detection. This paper examines how data mining methodologies, including clustering, classification, and anomaly detection, can be leveraged to enhance cybersecurity defenses. By systematically analyzing large datasets from various sources such as network traffic, system logs, and user activities, data mining tools can identify patterns and anomalies that signify potential security threats. Will discuss the integration of these techniques with machine learning algorithms to improve the accuracy and efficiency of threat detection systems. The study explores several data mining approaches, evaluating their strengths and limitations in detecting both known and novel cyber threats. Additionally, it addresses the challenges associated with data privacy, the volume and complexity of data, and the need for real-time analysis. The results illustrate that data mining not only aids in early threat detection but also provides a foundation for developing adaptive and proactive cybersecurity strategies. The paper concludes by outlining future directions for research and advancements in data mining for cybersecurity, emphasizing the need for ongoing innovation to counter emerging threats.

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