Graph-Based Approaches in Cybersecurity: A Comprehensive Survey

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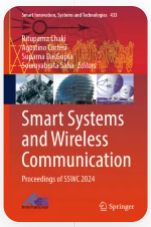

Smart Systems and Wireless Communication

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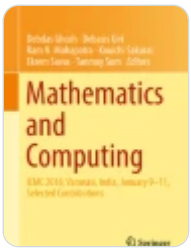
Abstract

For the ever-expanding threat cybersecurity needs some advanced methodologies for threat detection, vulnerability, assessment, and incident response. This comprehensive survey

paper explores the pervasive role of graph-based approaches in fortifying cybersecurity measures. The survey begins with navigations through the landscape of intrusion detection systems (IDSs) that leverage algorithms like PageRank. The paper elucidates how threat intelligence graphs enhance the understanding of cyber threats by modeling relationships between threat indicators. Furthermore, the survey investigates the vital role of Graph-Based Approaches in Cybersecurity assessment. It examines attack surface analysis and dependency mapping, elucidating how these techniques prioritize security efforts by identifying critical entry points and assessing the impact of potential vulnerabilities. The integration of blockchain technology with graph theory is discussed. The survey paper also explores real-world applications, comparative studies, and the challenges faced in deploying graph-based cybersecurity approaches at scale. In summary, this survey paper offers a panoramic view of the graph-based approaches employed in cybersecurity. It illuminates the strengths, limitations, and real-world implications of these methodologies, providing a valuable resource for cybersecurity practitioners, researchers, and policymakers navigating the complex and dynamic landscape of securing digital ecosystems.



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