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Big Data and Machine Learning Methods to Secure the Internet Sites

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Abstract

Over the past few decades, Internet sites have become integral components of business operations across all industries. This increased prominence, however, has also led to the emergence of various attack vectors damaging the web sites with service outages, poor user experiences, financial losses, and damaged reputations to the business. No web or mobile application on the Internet is immune to these attacks, underscoring the critical need for robust security solutions to safeguard websites against malicious attacks. At the heart of the security solutions lies the capability to accurately tell apart malicious actors from legitimate users with minimal false positives and false negatives, while the solutions should operate efficiently, exhibiting high performance, transparency, and cost-effectiveness. Robustness of the solution is also crucial to ensure that attackers cannot decipher the inner workings of the security systems, preventing them from adapting and circumventing security defenses over time. With the advent of machine learning and big data systems, security solutions have evolved to effectively detect and mitigate various threat vectors. The paper delves into an examination of various attack vectors, industry security solutions driven by big data and machine learning and outlines key design considerations necessary for creating effective and resilient security solutions. The paper concludes by offering a brief perspective on anticipated future developments to secure the Internet.

Keywords

Machine Learning, Big Data, Internet Security.

Biographies

Jongwook Sung works for F5, Inc. where he leads the research and development of enterprise security solutions, and also teaches at Lucas College of Business in San Jose State University. Jon has worked for multiple Silicon Valley companies to manage products and engineering projects in the areas of AI/ML, big data, cybersecurity, mobile, cloud, and networking industry. Jon has also provided technical and business consultations to venture capitals, business incubators, industry analysts, and operated boot camp programs for college students and business executives.

Taeho Park earned Ph.D. in Industrial Engineering at University of Wisconsin – Madison. He is a professor of operations and supply chain management at School of Global Innovation and Leadership, San Jose State University which is located in Silicon Valley. He is currently director of the School of Global Innovation and Leadership and director of Silicon Valley Center for Operations and Technology Management. He has published research papers in many well-recognized journals in the areas of operations and supply chain management, quality management, logistics management, system design, modeling, and optimization.