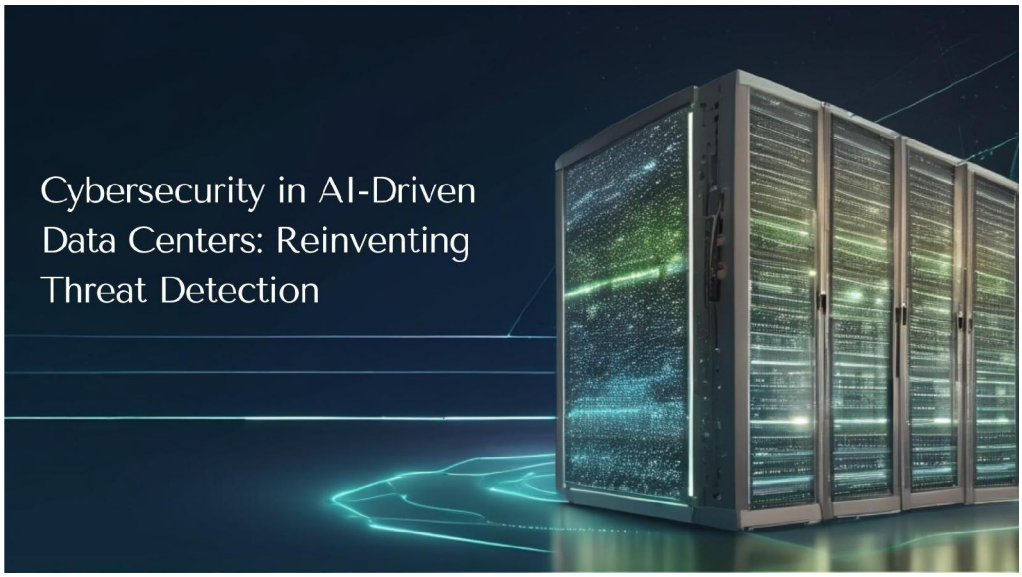
IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 7, March 2025

Cybersecurity in AI-Driven Data Centers: Reinventing Threat Detection

Subhash Bondhala
Southern University and A&M College, USA



Abstract: *The digital landscape faces unprecedented challenges as cyber threats targeting critical infrastructure evolve in complexity and frequency. Traditional security frameworks relying on static rule-based detection and perimeter defenses have proven insufficient against sophisticated attack vectors, including adversarial AI, polymorphic malware, and zero-day exploits. This article explores how AI-driven cybersecurity transforms protection strategies within modern data centers through autonomous threat detection, adaptive risk mitigation, and self-healing architectures. Integrating deep learning-powered Intrusion Detection and Prevention Systems (IDPS) with behavioral analytics enables the identification of subtle anomalies that conventional systems typically miss. Zero Trust Architecture enhanced by AI-driven continuous authentication establishes a security model where trust is never implici,t and access requires persistent verification. Security Orchestration, Automation, and Response (SOAR) frameworks leverage machine learning to correlate disparate events and automate response actions, dramatically reducing detection and remediation timeframes. As quantum computing emerges as a threat to traditional cryptographic standards, AI-optimized post-quantum cryptography presents viable solutions for maintaining security in the quantum era. The convergence of these technologies creates resilient cybersecurity ecosystems capable of adapting to emerging threats while maintaining operational continuity and preserving the confidentiality, integrity, and availability of critical systems and data.*

Keywords: AI-driven cybersecurity, behavioral analytics, zero trust architecture, security automation, post-quantum cryptography

DOI: 10.48175/IJARSCT-24464
ISSN 2581-9429 IJARSCT