

AI-Enabled Intrusion Detection Systems for Connected Device Networks: Challenges, Models, and Future Directions

Terli Swathi¹ and K. B. N. Abhinay²

M.C.A, M.Tech, Asst. Professor in Computer Science¹

B.C.A²

Sir. C. R. Reddy College of Engineering, Eluru

Abstract: *The proliferation of Internet of Things (IoT) devices has brought convenience and connectivity but also unprecedented security challenges. Traditional Intrusion Detection Systems (IDS) struggle with the scale, heterogeneity, and resource constraints of IoT networks. Artificial Intelligence (AI)-enabled IDS models, especially those based on Machine Learning (ML) and Deep Learning (DL), have emerged as promising solutions. This research paper investigates the effectiveness of AI-enabled IDS in IoT environments through a comprehensive empirical study. It includes a review of related literature, outlines clear research objectives and hypotheses, describes the research design and sampling method, and presents statistical analysis of experimental results using a benchmark dataset. The paper concludes with a discussion on the implications, limitations, and future directions.*

Keywords: AI, Intrusion Detection, IoT Security, Machine Learning, Deep Learning, Cybersecurity, Anomaly Detection

