

Enhancing Cyber Security Using Quantum Computing and Artificial Intelligence: A Review

Shoumya Singh¹ and Deepak Kumar²

orcid.org/0009-0001-9541-6177 and orcid.org/0009-0009-2137-0864

Department of Computer Science, San Francisco Bay University, CA, USA¹

Department of Information Technology, University of the Cumberlands, KY, USA²

Abstract: *This article examines the transformative potential of quantum computing in addressing the growing challenge of cyber threats. With traditional encryption methods becoming increasingly ineffective against sophisticated cyber attacks, quantum computing emerges as a promising solution, offering unparalleled computational capabilities for enhancing cyber security. This technology is poised to revolutionize how we protect sensitive data by developing quantum-resistant encryption algorithms and quantum-based machine learning modules to safeguard critical infrastructures. By exploring the intersection between quantum computing and cyber security, this article highlights the opportunities, challenges, and prospects of leveraging quantum advancements to strengthen our defenses against the evolving landscape of cyber threats.*

Keywords: Quantum Computing, Cyber Security, Machine Learning, Artificial Intelligence