

Quantum Computing for Enhanced Cryptographic Systems

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Abstract. Quantum computing holds the potential to revolutionize cryptographic systems by offering unprecedented computational power. This paper investigates the application of quantum algorithms in enhancing the security and efficiency of cryptographic protocols. By analyzing various quantum cryptographic techniques, the study provides insights into the future of secure communications. The implications of quantum computing for data protection and privacy are also discussed, highlighting the transformative impact on electronic systems.

Keywords: Quantum Computing, Cryptography, Quantum Algorithms, Secure Communications, Data Protection

Introduction

The advent of quantum computing presents a paradigm shift in the field of cryptography, with far-reaching implications for secure communications and data protection. This paper explores the potential of quantum algorithms to enhance cryptographic systems, offering increased security and efficiency compared to classical methods. By examining various quantum cryptographic techniques, including quantum key distribution and post-quantum cryptography, the study provides a comprehensive overview of the current state and future prospects of this emerging field. The research highlights the challenges and opportunities presented by quantum computing, emphasizing its transformative impact on electronic systems and the importance of preparing for a quantum future.

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References

1. Stall, K., & Kruk, G. (2023). The impact of technological innovation on employee retention in enterprises: a case study of quality control. *Zarządzanie Innowacyjne w Gospodarce i Biznesie*, 37(2), 57-77.
2. Abdykalykov, A., Bolotov, T., Kurbanbaev, A., Matyeva, A., & Zhumabaev, R. (2024). Optimisation of composition and strength properties of slag-alkali binders based on fuel slags. *Architectural Studies*, 1(10), 125-135.
3. Ассакунова, Б. Т., Болотов, Т. Т., & Омурбеков, И. К. (2017). Совместное воздействие карбонатной муки и пластифицирующих добавок на свойство бетона. *Вестник Кыргызского государственного университета строительства, транспорта и архитектуры им. Н. Исанова*, (3), 147-150.
4. Максатбеков, М., Болотов, Т. Т., & Тологонова, А. М. (2018). Инструментарии экономической экспертизы проектов государственно-частного партнерства. *Вестник Кыргызского государственного университета строительства, транспорта и архитектуры им. Н. Исанова*, (3), 147-154.