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A Decentralized E-voting System Using Blockchain

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This paper presents the design, implementation, and comprehensive evaluation of a decentralized blockchain-based voting system aimed at revolutionizing electronic voting (e-voting). Leveraging blockchain technology, the system offers a transparent, secure, and publicly verifiable voting platform, addressing key limitations found in traditional e-voting approaches. The system employs Proof of Work (PoW) as its consensus mechanism, ensuring strong security through computational challenges. To protect vote integrity, the Digital Signature Algorithm (DSA) with SHA-256 is utilized for signature authentication, while the Advanced Encryption Standard (AES) ensures data confidentiality. Furthermore, Elliptic Curve Cryptography (ECC) enables secure and efficient public vote auditing. Extensive experimental evaluations, including tests against attacks such as vote sniffing, signature spoofing, and denial of service (DoS), demonstrate the system's robustness and resilience. The results confirm that the proposed blockchain architecture significantly enhances security and transparency, contributing to the evolving landscape of e-voting. This work underscores the potential of decentralized platforms to transform electoral processes by bolstering trust, accessibility, and overall democratic integrity.

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