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Enhancing the Security of Digital Voting Systems: A Blockchain-Based Decentralized Approach for Future Electronic Voting Systems

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Abstract: *This paper introduces a blockchain-based electronic voting (e-voting) system aimed at improving voter turnout and ensuring robust security. Traditional offline elections often suffer from fairness and accuracy issues due to centralized control, which can lead to vote manipulation. The proposed system leverages blockchain technology to decentralize authority, reduce reliance on a single entity, and enhance transparency. It comprises four stages: setup, registration, voting, and result, each utilizing smart contracts to maintain an immutable record. Key features include secure voter and candidate registration, encrypted vote casting, and transparent result dissemination. By addressing critical security concerns such as vote uniqueness, mobility, coercion resistance, anonymity, and data integrity, this system offers a reliable and transparent solution for modern elections.*

Keywords: blockchain-based electronic voting