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Securing Online Voting With Blockchain and Smart Contracts

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Abstract : Democratic voting is vital for any country, but current methods like ballot papers or EVMs have drawbacks, including transparency issues, low voter turnout, and security concerns. Blockchain technology offers a potential solution by providing a secure, decentralized, and transparent platform for e-voting. With features like immutability, security, and anonymity, blockchain combined with smart contracts can enhance trust and prevent vote tampering. This paper explores an Ethereum-based e-voting application using Solidity, showcasing a web app that prevents duplicate voting through a token-based system, while also discussing the advantages and limitations of blockchain in digital voting. Voting is a crucial component of democratic decision-making, yet current methods, like paper ballots, remain outdated and inefficient. This paper reviews blockchain-based voting systems, highlighting strategies and guidelines to create a comprehensive electronic voting system that leverages cryptographic techniques, such as zero-knowledge proofs, to enhance privacy. It addresses limitations of existing e-voting solutions, including cost, identity management, and scalability, and provides key insights for organizations looking to design their own blockchain-based voting systems.

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