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Advanced Blockchain-Based Framework for Enhancing Security, Transparency, and Integrity in Decentralised Voting System

Suhag Pandya
Independent Researcher
spandya5886@ucumberlands.edu

Abstract: *The modern challenges of supply chain control arising from globalisation, decentralisation, and modernisation are rapidly exposed to data leakage, network attacks, and software flaws. Business stakeholders are turning to blockchain technology as a possible solution to improve modern supply chains' reliability, integration, and visibility. Blockchain is an elaborate structure that remains relevant when managing product traceability, integration, and increasing general transparency. This article explores the possibility of blockchain technology enhancing the transparency, integrity, and security of decentralised voting systems. Blockchain, which is decentralised, irreversible and fully transparent, is an alternative solution to the world's problems described by manipulation, fraud and lack of transparency inherent in the globalisation of voting systems. The paper considers several models of voting on the basis of blockchain technology, comparing their advantages, which consist of providing the inviolability of the election results as well as minimising the usage of the intermediaries' services. Evaluating blockchain technology using election procedures as a perspective, this article explores its foundational features, such as cryptographic protections, consensus processes, and ever-executable contracts. Other issues that are named by the study as the challenges for implementing blockchain technology in voting include scalability, energy consumption, and legal issues. This research aims to respond to these questions for enhancing election systems in the digital world by reviewing the literature comprehensively on blockchain technology for decentralised voting and providing a brief overview of the current trend. The results highlight the need for more study into blockchain-based voting systems to resolve the technological and ethical issues that have been raised.*

Keywords: Blockchain Technology, Decentralized Voting Systems, Data Integrity, Transparency, Security, Cryptographic

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