Transforming E-Voting with Blockchain: A Review of Technologies and Practical Implementations

Prof. Trupti Sonkusare[1], Justin Joseph[2], Kirti Karna[3], Yashraj Sharad Gorde[4]

Professor, Department of Computer Engineering (CE)[1]

Students, Department of Computer Engineering (CE)[2,3,4]

ISB&M College of Engineering, Pune, Maharashtra, India

Abstract: *The integration of blockchain technology into electronic voting systems promises to address critical challenges in electoral processes, such as security, transparency, and trust. Traditional voting systems, whether manual or electronic, face concerns related to privacy, data integrity, and vulnerability to manipulation. Blockchain, with its decentralized and immutable nature, offers a transformative solution to these challenges by ensuring end-to-end verifiability and tamper-resistant record-keeping. This review paper explores the current landscape of blockchain-based e-voting systems, evaluates existing technologies, and highlights open challenges that need to be addressed for large-scale adoption. It also presents insights from practical implementations, including an overview of a blockchain-based e-voting project. The paper aims to provide a comprehensive understanding of how blockchain can reshape the future of secure and transparent voting systems.*

Keywords: Blockchain, Electronic Voting, E-Voting Systems, Security, Transparency, Decentralization, Smart Contracts, Ethereum, Voting Integrity