

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 4, March 2024

Smart and Secure E-Voting Application using Blockchain Technology

Prof. V. M. Khanapure¹, Joshi Mahi², Kadam Amruta³, Patil Swarupa⁴,

Swami Gayatri⁵, Kambale Sakshi⁶

HOD, Department of Information Technology¹ Students, Department of Information Technology^{2,3,4,5,6} Puranmal Lahoti Government Polytechnic, Latur, Maharashtra, India

Abstract: The realm of electronic voting systems is experiencing a profound transformation propelled by technological advancements. In response to the demand for secure and transparent voting mechanisms, this project, supervised by Mrs. V.M. Khanapure, endeavors to develop a Smart and Secure E-Voting Application employing blockchain technology. Traditional voting methods often face challenges related to tampering and fraud, which the proposed system aims to mitigate through the decentralized and immutable nature of blockchain. By leveraging the strengths of blockchain, such as transparency and decentralization, the project seeks to establish a trustworthy and efficient electronic voting solution.

A primary focus of the Smart and Secure E-Voting Application is the implementation of advanced security measures. Cryptographic techniques are incorporated to secure vote transmissions and protect voter privacy. The application employs end-to-end encryption and multi-factor authentication, fortifyingthe overall security posture of the system. Moreover, the user-friendly interface caters to both voters and election administrators, ensuring accessibility without compromising the high level of security. This project not only addresses current challenges in electronic voting but also lays the foundation for future innovations, setting a precedent for reliable and transparent electoral processes through the utilization of blockchain technology.

Keywords: blockchain technology

I. INTRODUCTION

The landscape of democratic processes and electoral systems has been undergoing a substantial evolution in recent years, prompted by the rapid advancements in information technology. Traditional voting methods, reliant on paper ballots and manual counting, have faced persistent challenges such aslogistical inefficiencies, susceptibility to fraud, and the need for extensive resources. In response to these limitations, electronic voting systems have emerged as a potential solution to streamline the voting process and enhance the overall integrity of elections.

However, the transition to electronic voting brings its own set of challenges, particularly in terms of security, transparency, and voter trust. Ensuring the confidentiality and accuracy of votes in an electronic environment has become a critical concern for electoral authorities and stakeholders. It is within this context that the project, under the guidance of Mrs. V.M. Khanapure, seeks to contribute to the advancement of electronic voting systems. By focusing on the integration of blockchain technology, a decentralized and tamper-resistant ledger, the project aims to address the vulnerabilities inherent in traditional electronic voting systems and establish a foundation for a secure and transparent e-voting application. This general background sets the stage for understanding the necessity and relevance of the proposed Smart and Secure E-Voting Application.

II. LITERATURE SURVEY

In the digital era where hacking and bypassing a system is easy, tampering of data is always possible leading to bad situations. Blockchain is used to store data which is near impossible to change or tamper with as it is very secure in nature. Voting as a process in any nation is an essential event and if votes get miscalculated by any external source it will be harmful. To avoid such kinds of situations and making it more comfortable blockchain technology comes in

Copyright to IJARSCT www.ijarsct.co.in DOI: 10.48175/IJARSCT-15999



IJARSCT



International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 4, March 2024

acknowledgment. This paper proposes a decentralized national e-voting system based on blockchain technology. It includes an admin panel to schedule the voting, manage candidates and declare the results. The web application will provide the users with an interface to enter their Aadhar card ID (text input) and a photo of themselves at the time of voting. The eligibility of the voter will be checked at the time they enter their Aadhar card ID. Eligible voter's phone numbers will be verified via One Time Password (OTP). After voter verification, individual voters will be considered eligible for voting. During voting, voters will be monitored through a webcam/front camera. The votes will be stored in a blockchain and any tampering would be detected easily. The address and the corresponding constituency will be checked in the backend.

III. PROPOSED IMPLEMENTATION

The proposed decentralized voting system using Ethereum blockchain aims to provide a transparent and tamper-proof solution for conducting elections. By leveraging smart contracts on the Ethereum network, the system enables secure and anonymous voting, while ensuring the integrity and immutability of the voting data. This would increase voter trust in the election process and reduce the risk of fraud or manipulation.

Objectives of Proposed Research:

1. Security: The proposed system aims to provide a secure platform for conducting elections, eliminating the possibility of tampering with votes, and ensuring that the election results are transparent and verifiable.

2. Transparency: The proposed system aims to provide complete transparency to the voters, allowing them to view the entire voting process, including the vote counting and results.

3. Accessibility: The proposed system aims to make the voting process more accessible to all eligible voters by eliminating the need for physical presence at a polling station, thus increasing voter turnout.

4. Efficiency: The system aims to increase the efficiency of the voting process by reducing the time and resources required to conduct elections. Since the system is automated and eliminates the need for intermediaries, it can significantly reduce the cost and time associated with traditional voting methods.

5. Trust: The proposed system aims to increase trust in the voting process by providing a transparent and tamper-proof mechanism for recording and tallying votes

IV. FLOWCHART



Copyright to IJARSCT www.ijarsct.co.in ISSN 2581-9429 IJARSCT

627



IJARSCT

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal Volume 4, Issue 4, March 2024

V. OUTPUT

+ + 0 @ bolhest300/#o	aded			± •		± 0	₽ 1
Ø ADMIN				🚨 Voting	🖪 Results		
	Yeur Ao	munt: Grafie72ale3AA38AfC8	4699917783e92313688852A				
	The election has not been initialize. Set up the elector.						
	About Admin						Ø
		Full Name First Name					
		Brial np. ynsdesample.com					•
	View this project on <u>ditHul</u>	b	Made with \$\$ by Supa	sh Kusumkar			÷.
		Fig: Admin	Panel				

@ ADMIN About Election Election Title eg. School Election Organization Name ep. Lifeline Academy •: Do not forget to add candidates. Go to add candidates page. • Slart Election View this project on GitHub. Nade with V by Suvash Kusumkar

Fig: Admin Panel

Copyright to IJARSCT www.ijarsct.co.in







International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

IJARSCT

Volume 4, Issue 4, March 2024

+ + a 🙆 koshorcitor	haded			÷ •	●● ○ = = = =	0 :
© ADMIN				💻 Voting	E Results	
		ng, Lifeline Academy				
	De met fermet to add en				1	
	On to add candidates pape.	indidaces.				a
		Start Election				- 1
	Election Status				_	
	Started: False		Ended: False	í.		
	View this project on GitHub.		Nade with 🗢 by Sava	sh Kusumkar.		<u>.</u>

Fig: Admin Panel



Fig: Adding Candidate with blockchain Security







International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

IJARSCT

Volume 4, Issue 4, March 2024

🖨 Ganathe			- 0	×
ACCOUNTS (III) BLOCKS (2) TRANSACTIONS (III) CONTRA	CTS () ENERTS () LOSS			٩)
COMMENT ILLOS CALIFICOS ILLOS ILLOS PARAMAN METRORE D MECUNICAS 4 2000/2000/00/00 1221/035 MICROS 5777 HTTP://127	ALL:17545 AUTOMINIOS	BLOCHCHARN VOTING APPLICATION	SWITCH	0
MADMONE [] tomerrow move myself around pull essence believe health gri	ef spin weapon step	HD PATH IIII.4 ' 60	'0'0account	index
.comiss 0≈a52e72a2e3AA38AfC84EB991f783e923136B8b2A	99.96 ETH	TX DOUNT 4	HEX 0	I
ADDRESS 8×89197b64D26e55A3E7875ec7E3968b4D9F533175	100.00 ETH	te count O	NEX 1	ð
.comm 8×c88549B7881D139C9BAe7Cd524DA2164BAA6dfA8	100.00 ETH	TX COUNT 0	MICK 2	I
x009105 8×BbF91dEDeB34D6e74fFCA5CCd2182b23f44e58B4	169.00 ETH	ts count 0	HEX 3	I
ACONTEN 8×d7777F63f9Af9adf5deaA59Ff825cC4aD8e82195	160.00 ETH	ts couvr B	MREX 4	ð
^{ACORCESS} 8≈8568C356244b98De8AdE37777186e3c89916B4b5	160.00 ETH	te couve O	ndix 5	đ
x000155 8×8a6523d1eb08D2188543e92645f716824b2d073a	5H.AHEE 160.00 ETH	tx count B	MBEX 6	ð

Fig: Ganache Server to add ETH in Server for Authentication



Fig: Available Accounts and Private Keys will show in CMD

VI. CONCLUSION

Decentralized Voting with Ethereum Blockchain offers a robust and transparent solution for secure elections. By leveraging blockchain technology, it ensures the integrity of votes and provides a tamper-proof platform. With ISSN

Copyright to IJARSCT www.ijarsct.co.in

DOI: 10.48175/IJARSCT-15999



630

IJARSCT



International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 4, March 2024

continued enhancements, including improved user experience, scalability, and integration with other cutting-edge technologies, it has the potential to revolutionize the democratic process and empower citizens to participate in a trusted and efficient voting system. It represents a significant step towards building a more democratic and accountable society.

REFERENCES

- [1] Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. Retrieved from https://bitcoin.org/bitcoin.pdf
- [2] Tapscott, D., & Tapscott, A. (2016). Blockchain revolution: How the technology behind Bitcoin is changing money, business, and the world. Penguin.
- [3] Swan, M. (2015). Blockchain: Blueprint for a new economy. O'Reilly Media, Inc.
- [4] Bhargava, R. B., & Ranchal, R. (2017). Blockchain for dummies. John Wiley & Sons.
- [5] Antonopoulos, A. M. (2014). Mastering Bitcoin: Unlocking digital cryptocurrencies. O'Reilly Media, Inc.
- [6] Zohar, A. (2015). Bitcoin: Under the hood. Communications of the ACM, 58(9), 104-113.
- [7] Eyal, I., &Sirer, E. G. (2018). Majority is not enough: Bitcoin mining is vulnerable. Communications of the ACM, 61(7), 95-102.
- [8] Li, X., Jiang, P., Chen, T., Luo, X., & Wen, Q. (2017). A survey on the security of blockchain systems. Future Generation Computer Systems, 1(5), 119-129.
- [9] Kshetri, N. (2017). Can blockchain strengthen the internet of things? IT Professional, 19(4), 68-72.
- [10] Merkle, R. C. (1987). A digital signature based on a conventional encryption function. Advances in Cryptology–CRYPTO'87, 369-378.

