Blockchain Technology Trustworthy Voting Application

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Abstract: Standard voting procedures are essential for democracies while being deficient in security measures and non-biased operations. The proposed project implements blockchain technology through Hyperledger Fabric because it enables strong voting security and protects privacy while attesting user identification and vote registration. The implementation of this system prevents vote alteration while enhancing visibility within the process. The system offers simple usage for educational establishments and small companies while displaying capabilities to expand for broader electoral requirements. The system protects digital voting through Blockchain which delivers authentic secure processes.

Keywords: blockchain, security, Hyperledger, voting

I. INTRODUCTION

Every occupant possesses the indigenous right to bounce while leader selection through voting represents a pivotal procedure. The process of traditional voting frequently leads to both sluggish operations and high costs and insecure results. The circumstance of fraudulent votes together with duplicated entries and election affect manipulation leads to declining public trust in the voting system. The perpetration of technological results represents feasible result to overcome this problem. One similar technology is blockchain.

Data in blockchain exists inside blocks which form digital record books that help any type of revision after saving. This system functions impeccably to record voting data. Our design employed the private blockchain system Hyperledger Fabric as the voting result for maximum security measures. The Hyperledger platform only permits chosen actors to join its network while offering better operation capabilities.

The system contains three functions enabling druggies to produce accounts, peers their accounts and eventually submit their votes. The voting process sends information to the blockchain structure. The system functions to help any unauthorized manipulation of results or vote tampering. Also the system maintains full translucency through its safe voting process.

Blockchain technology benefits advancing systems because it provides both speed and protection and fairness. The system reduces both time conditions and homemade labour. The substance of our design involves developing a straightforward blockchain-grounded voting result that could work for academy choices and association vote collections and unborn large- scale choices.

II. LITERATURE REVIEW

Multiple governmental and academic groups have tried ultramodern technological results to enhance voting system operations. A many voting systems continue to witness challenges because of translucency issues together with tampering pitfalls and security sins. Blockchain technology provides the result because of its unique capacities. The data remains defended through this system after saving while all sale way produce visible records.

In 2008 Satoshi Nakamoto released blockchain as the core invention through Bitcoin.[1] The author detailed how blockchain operates as a secure decentralized system for data storehouse and transfer in his publication. The cryptocurrency- grounded invention handed the introductory methodology which latterly fanned out to colorful sectors including voting systems.

The authorized Hyperledger Fabric attestation explains the functionality of private blockchain systems by furnishing straightforward details. [2]The

document provides details about the rudiments of permissioned networks as well as the setup of channels alongside data sequestration rules between different associations. The nature of Hyperledger makes it a suitable result for advancing systems which bear vindicated druggies to share.

The composition by Zhang and Xue (2019) presented smart contracts as tools to establish automatic voting procedures. Smart contracts store blockchain votes permanently after their prosecution in the system following their cast. [3]Their exploration demonstrated how the methodology decreases both mortal miscalculations and enhances protection norms.

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III. EXISTING SYSTEM

The voting practices utilized in current elections consist of paper ballots together with Electronic Voting Machines (EVMs). [4]Traditional voting systems encounter various difficulties because they suffer from falsified votes alongside equipment tampering along with mistakes made by people and lack complete voter transparency . Voters do not easily access verification capabilities for their cast votes after submitting them.

[5]Website-based and mobile app voting systems exist while maintaining data storage in centralized databases that internal personnel or cybercriminals can compromise . The voting technology lacks comprehensive documentation which showcases all voting procedure stages.

[1]The inventor Satoshi Nakamoto launched blockchain in 2008 as a protected database solution . [3][7]Researchers proposed blockchain usage after its initial introduction to establish unalterable and transparent voting records.

The security features of Ethereum's public network do exist but speed and privacy remain major vulnerabilities. [2][6]Through Hyperledger Fabric users can achieve both data privacy and network administration control because the platform enables specific data visibility rules .

Users continue to lack trustworthy, tamper-proof methods for voting because most present systems remain inadequately secure and unverifiable.

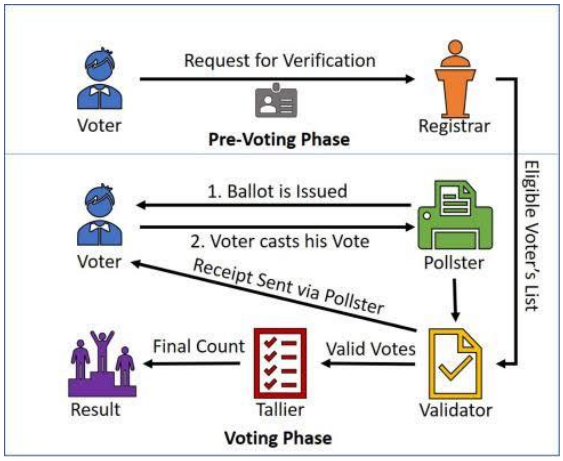


Fig. 1 Existing System

IV. SYSTEM IMPLEMENTATION

Our project implements a secure voting system through Hyperledger Fabric private blockchain platform development and design. This system provides access to authorized users only when they wish to vote.

Users must provide their name and Aadhaar number while signing up for the application through the User Registration Page as well as their mobile number and necessary basic details. Users need to authenticate their login with an OTP that arrives on their mobile number associated with their Aadhaar account for system security. The double authentication process protects the system from unauthorized users trying to gain access.

After valid login authentication the system brings users to the User Dashboard interface. The user interface of this page presents a candidate selection list together with voting functionality. Users can pick their favored candidate before casting their vote. The voting activity becomes permanently part of the Hyperledger Fabric blockchain following its recordation which maintains both visibility and unchangeability of data.

Through the system management has access to an Admin Login Page. The Admin Dashboard becomes accessible through valid credential entry but offers functions for user registration management as well as candidate monitoring and vote count observation with process verification options.

The implementation of Hyperledger Fabric enables us to construct a permissioned network where authorized users together with admins have access to contribute to the system. The system records votes through secure transactions that exist unaltered since they cannot be modified to provide both full transparency and trust.

This system implementation prevents fraud while removing chances of double voting and lets every user check if their vote has been recorded properly. The voting system receives blockchain security and privacy through a system that maintains user-friendliness.

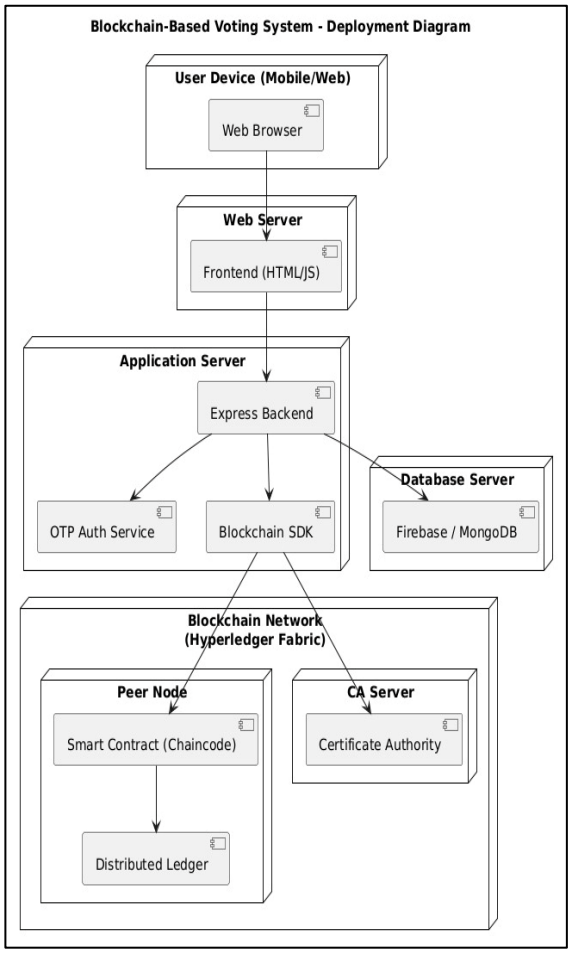
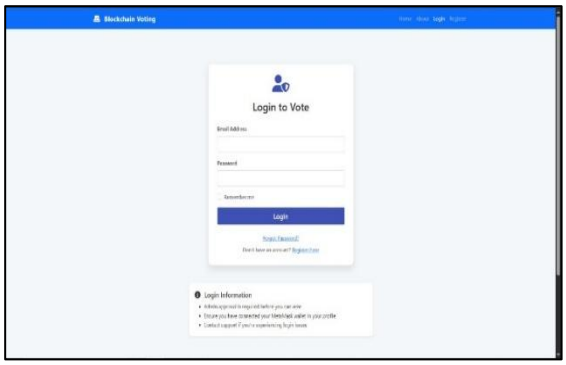


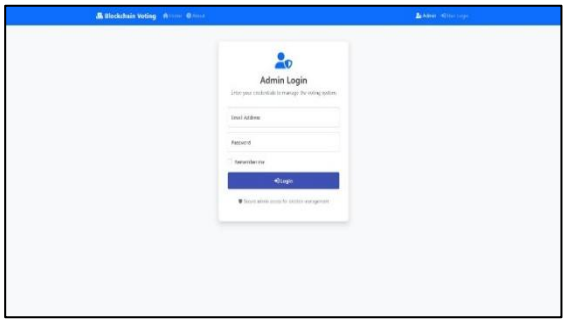
Fig. 2 System Architecture

Results:

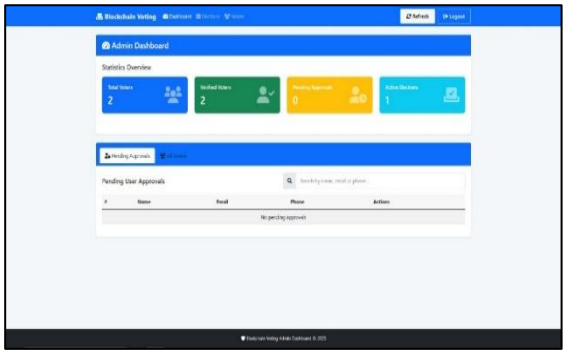
1. User Login



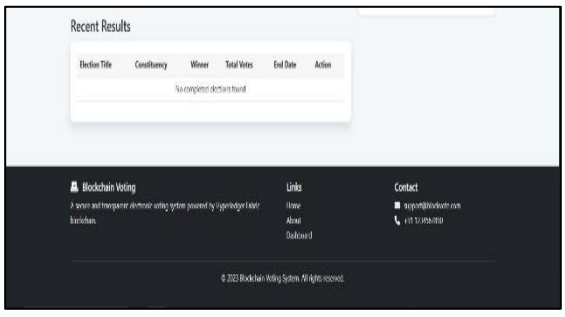
2. Admin Login



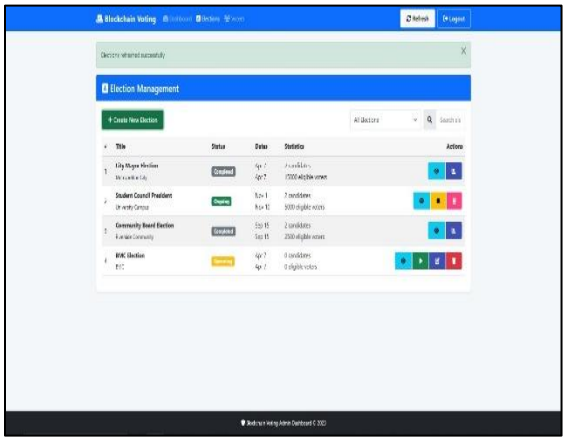
3. Admin Dashboard



4. Voting Results



5. Election Management Status



V. CONCLUSION

This study demonstrates how blockchain benefits voting security through trustworthy risk mitigation. The Hyperledger Fabric platform provided us with an exclusive platform that maintained voting security while allowing participants to vote without fraud or manipulation threats. The system protects records with full transparency and serves as a prevention method against cheating. This type of system represents a new method through which we can view both election processes and online voting systems.

VI. FUTURE SCOPE

The system can receive future upgrade by integrating face recognition capabilities together with mobile application features and biometric authentication methods. This system has the potential to expand its size for use in government and city-wide voting elections. The combination between enhanced cybersecurity software and public awareness development will create blockchain voting as a viable system to ensure transparent elections across global territories.

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