Blockchain based E-Voting System

This project aims to revolutionize the voting process by implementing a blockchain-based e-voting system that ensures transparency, security, and accessibility.

Outcome of the project: Research Paper

PCSE25-74

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Course Outcome	Sustainable Development Goals
CO1: To analyze and describe the problem domain.	**SDG 16:** Peace, Justice, and Strong Institutions
CO2: To formulate clear work plan and procedure.	**SDG 9:** Industry, Innovation & Infrastructure
CO3: To describe and evaluate both generic and specific skills	**SDG 10:** Reduced Inequalities
CO4: To design and apply modern tools for designing and drafting.	**SDG 11:** Sustainable Cities and Communities
CO5: To design report and presentation.	

Project Abstract

Overview

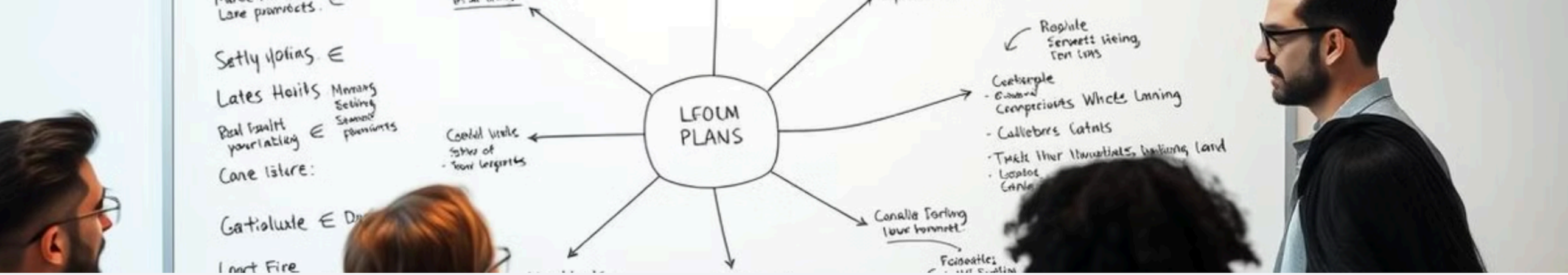
This project leverages blockchain technology to develop a secure, transparent, and reliable e-voting system as an innovative alternative to traditional voting methods, such as paper ballots and electronic voting machines (EVMs)

Key Objectives

Enhance the security, transparency, and reliability of the voting process; safeguard the integrity of voter data; and empower stakeholders to trust and adopt this advanced voting mechanism.

Approach

Develop and deploy a blockchain-based e-voting platform utilizing **Ethereum smart contracts**, with **Truffle** for contract development and testing, and **Ganache** as the local blockchain client for simulation. **MetaMask** serves as the browser-based wallet for seamless interaction with the blockchain, ensuring user-friendly access and secure voter participation.



Project Goals and Objectives

Secure and Tamper-Proof Voting

Leverage blockchain’s decentralized and cryptographic nature to protect against tampering and unauthorized access.

1

2

Transparency and Trust

Build a transparent voting platform where stakeholders can independently verify and audit votes.

Accessibility and Ease of Use

Intuitive interface and user experience that allows seamless voter participation, small-scale organizations and communities, to adopt blockchain-based voting easily.

3

Methodology and Approach

1

System Architecture Design

Develop a secure and transparent blockchain framework, outlining smart contract logic and data flow for seamless vote recording and verification.

2

Smart Contract Development

Code and test smart contracts using Truffle to ensure accurate vote counting and tamper-proof records.

3

User Interface Creation

Build an intuitive front-end interface for easy voter interaction, integrated with MetaMask for secure blockchain access.

4

Testing and Feedback

Conduct trial runs using Ganache to simulate elections, collect user feedback, and optimize system performance for real-world use.

Expected Outcomes and Impact

Enhanced Voter Verification

Verify voter identity while maintaining privacy, ensuring only eligible voters can participate.

Maintained Anonymity

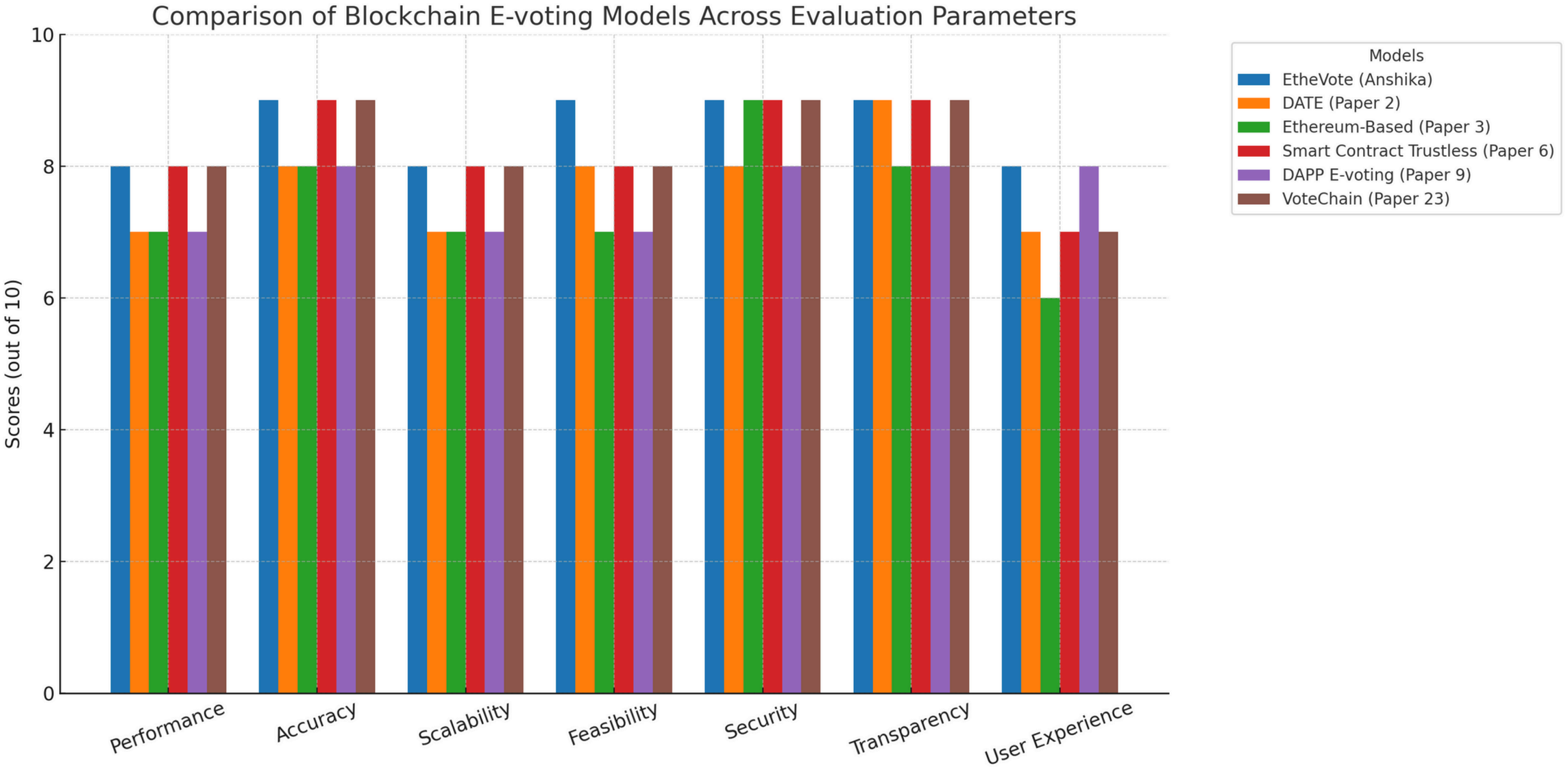
Uphold voter confidentiality, ensuring that individual choices remain private and protected.

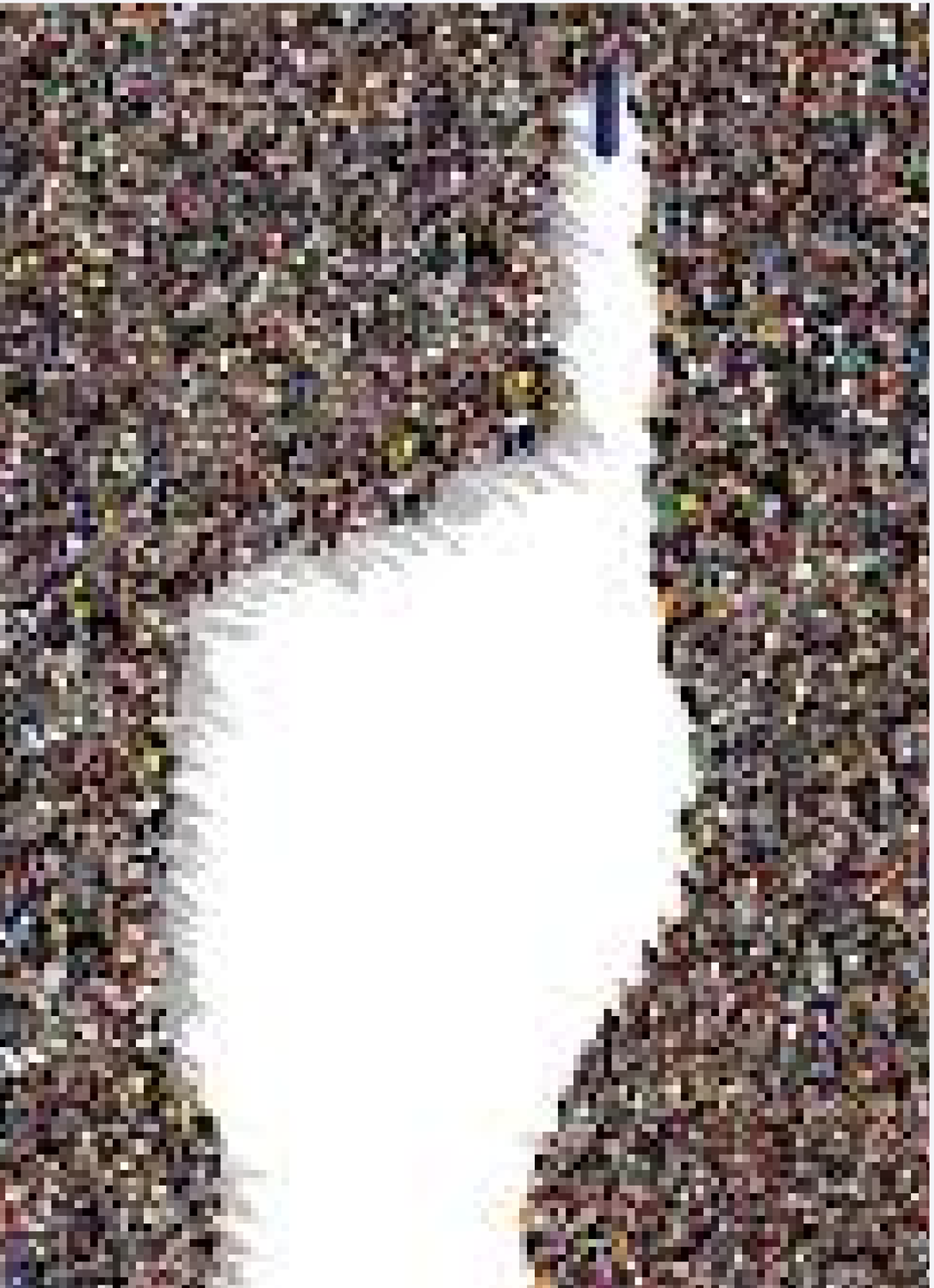
Increased Transparency and Trust

Provide real-time, verifiable vote tracking, boosting transparency and reducing opportunities for election fraud or rigging.

Key Project Deliverables

User Authentication System	Integrated voter identity verification system.
Smart Contract Suite	Custom-developed smart contracts for vote recording, tallying, and verification.
Blockchain Voting Platform	A blockchain based e-voting platform for secure and transparent elections.


Comparison of Blockchain E-voting Models Across Evaluation Parameters
Scores (out of 10)
0
2
4
6
8
10
Performance
Accuracy
Scalability
Feasibility
Security
Transparency
User Experience
Models
EtheVote (Anshika)
DATE (Paper 2)
Ethereum-Based (Paper 3)
Smart Contract Trustless (Paper 6)
DAPP E-voting (Paper 9)
VoteChain (Paper 23)



Next Steps and Conclusion

1

Scale and Expand

Scale the blockchain e-voting system from small-scale use cases to regional and national elections.

2

Continuous Improvement

Gather feedback from pilot projects and real-world implementations to refine the system further.

3

Collaborate with Governments

Work with policymakers and election authorities to integrate the system into existing electoral processes, overcoming regulatory challenges and aligning with local laws.