BLOCKCHAIN BASED E VOTING SYSTEM

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Abstract : Traditional voting system has failed to maintain integrity, security and transparency of the voters and in present pandemic situation, many voters are afraid to come out stand in long waiting queues to take advantage of their fundamental right (voting). In order to solve this problem, we are using the blockchain technology and smart contracts to build our application for voting which is accessible to all the voters and at their convenience. The application uses smart contracts which run on Ethereum blockchain. Only the election commission have access for writing the smart contracts for different regions and publish the written smart contracts on the opensource platform so that anyone can verify the smart contract written by election commission. This system solves the problem of transparency, security and integrity.

Index Terms **-** Blockchain, Ethereum, Ganache, Truffle Suite, E-Voting, Decentralized voting.

I. INTRODUCTION

Electronic voting or e-voting is a fundamental component of democracy that enables the general public to have their say in the form of a vote. It has various advantages over paper-based systems. Despite the advantages of e-voting, there are still challenges in achieving widespread adoption. One of these is ensuring that the systems are resilient against potential faults.

The blockchain does not assign all data to a single server, but rather to a distributed database, which is a decentralized method of allocating data. The data is spread across all connected devices via a peer-to-peer network of nodes that communicate with one another. The blockchain is described as a new, decentralized, and distributed technology that has the potential to improve a variety of businesses. Expanding e-voting to include blockchain technology could be the answer to addressing the current issues with the system.

Bitcoin is a first-generation blockchain application. The Ethereum Foundation introduced smart contracts as a use case for second-generation blockchain. Smart contracts are pieces of code that are distributed across all blockchain nodes and only run when a specific condition is met. The blockchain, together with smart contracts, appears to be a promising contender for developing safer, cheaper, more secure, transparent, and easier-to-use electronic voting systems.

An e-voting system must be safe, as it must not allow duplicate votes and must be completely transparent while safeguarding the attendees' privacy.
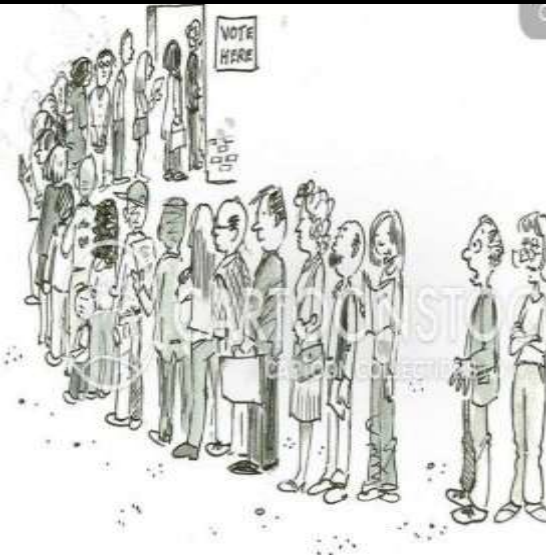
Fig. 1. Waiting Queues Infront Of Voting Booth

Fig. 2. Features Of Smart Contracts

II. LITERATURE SURVEY

Paper [1] is a blockchain based e-voting system that runs on Ethereum by using local blockchain Ganache and meta mask for signing with the private keys which makes the user need to install the meta mask extension and does not display the results live. Need a meta mask extension for users for voting which makes the d-app not so user friendly.

Paper [2] exposes app to assure security by merging Aadhar verification with VID using the digital signature, which is converted from fingerprint data, plays a key part in maintaining security ,this d-app does not allow the election commission to add and delete the election candidates party names and this d-app is not open sourced .

Paper [3] Administrative tasks do not have their own function. Smart contracts aren't being taken advantage of to their full potential. In a real IoT-based e-voting approach leveraging blockchain technology for transparency, the results are not displayed. Costly because we need to buy the hardware or replace the old one with existing one.

Paper [4] is a the smart card prototype's implementation results as key storage in the e-voting application show that the smart card can be utilized for more than just storing the voter key ,this app requires a distruibution of a smartcard which is costly.

Paper [5] is about using Ethereum and Meta mask to construct the proposed blockchain-based e-voting system may be a solution to the e-voting system's security and trust issues. For voting purposes, a meta mask extension is required. The results are not displayed in real time.

Paper [6] Uses secret contracts to address the problems of maintaining voter anonymity   and   the   confidentiality of the vote cast by him. Does not have admin activities. Does not display results live.

Paper [7] This is a system of transparent, unbiased, verifiable and reliable voting system that does not base its trust in the administrative authorities, rather it provides cryptographic guarantees to provide all the necessary features that a good voting system must have. No role of admin activities. The private key is already generated in advance and sent to user to sign in which may lead to attacks. Results are not displayed live.

Paper [8] Implemented on Ethereum blockchain based e-voting system which is governed by the smart contracts, written in solidity programming language. Not opensource and no one can view the code except the admin.

III. RESEARCH METHODOLOGY

3.1. OBJECTIVES

- Help voters cast their vote at their convenience.
- Security – it is impossible to change someone else's vote, delete votes or affect the accuracy of the final tally.
- Conduct election in a transparent manner.
- Reduce the cost of conducting the election.
- To reduce the mob in the society.
- Remove the human error in counting the votes.
- Ensure no fake votes has been casted.

- User friendly interface so that all people can understand the final tally.

3.2. METHODOLOGY
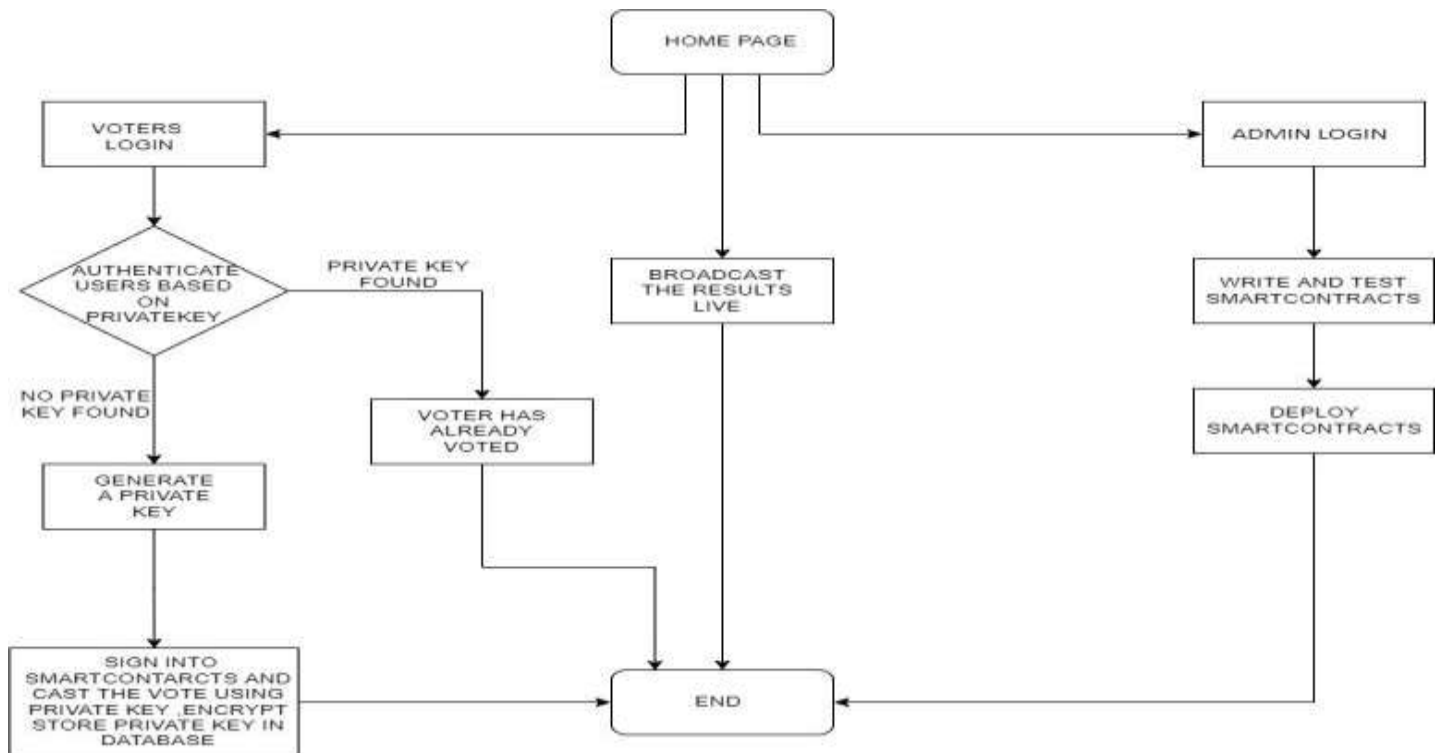
a. Home Page: This is the starting home page of the application which basically is used to logging as voter or admin and here anyone can view the voting results live.

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c. Admin Login: Admin is given a 32-bit alphanumeric password to enter into the admin portal for performing admin activities.

d. Write and Test Smart Contracts: The admin is provided the solidity environment where he can write the smart contract and compile and test them on the test network.

e. Deploy Smart Contracts: Admin can deploy the finalised smart contracts into the main net blockchain and to the open-source repositories for users to verify the smart contracts.

f. Broadcast The Results Live: Anyone can view the results of the voting live, and these results are updated for every batch of 1000 votes casted.

g. Voters Login: User is authenticated using his/her voter ID via two step authentications. After the voter enter voter ID the application will send OTP to voter phone as soon as he enters the correct code voter is authenticated.

h. Voting Status Based on Private key: Voter is checked whether he has encoded private key in the voter id database, if voter has encrypted private key in the database, then the voter is presented with the voter has already voted screen.

i. Generate a private key: If there is no private key in the voters database then we create a private key for the user to sign into the smart contract and encrypt the private key and store it in the voters database and the voter is displayed with 'I VOTED' screen.

IV. CONCLUSION

This paper proposes a decentralized, transparent, and verifiable voting system that does not place reliance in administrative entities, but rather provides a decentralized and transparent electionprocess. Smart contracts are available on opensource website. The application does not require any extensions to sign in to the smart contract and lets voters to exercise their constitutional right to vote.

V. ACKNOWLEDGMENT

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