



## Block Mat

### *An Indian Decentralized Voting Mobile App*

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**Abstract :** Indian elections are considered the world's biggest electoral exercise. Where approximately 900 million voters cast their ballots. Over the years conventional voting methods such as ballot paper have garnered a lot of criticism for their limited voter safety and Transparency measures. Also, counting the votes is a monotonous task that requires a lot of resources. To solve these problems Digital technology such as Electronic voting systems and online voting methods are used in the elections process in many nations. Although more beneficial than the traditional ballot paper method, there are many ways of manipulating the system and hindering the citizen votes. By considering the above-mentioned problems, this project aims to create a decentralized mobile based system called "Blockmat" for creating a more secure voting mechanism by combining an Ethereum-based blockchain network along with verification techniques to the current voting procedure. This System Will Address the data integrity, anonymity, privacy, and security of the Voters.

**IndexTerms - Blockchain, Ethereum, Aadhar id, mobile, Smart contract**

### 1 INTRODUCTION

E-Voting or electronic voting is a way of conducting the election process without the traditional paper ballots. The e-voting system acts as a Framework to decrease the percentage of abstention and to ensure the security against tampering with the votes. The result of the elections can decide the fate of the country. Thus it is imperative to ensure that each vote cast through the voting system is reliable.

Blockchain is a distributed and decentralized ledger that is used to record transactions in an efficient verifiable manner. The use of Blockchain in the E-voting system can ensure the security of votes by preventing modification of data stored in blocks using the cryptographic technique. Ethereum Blockchain Allows the use of Smart contracts which are also immutable like blockchains. it can be used to create tamper-free voting calls to the blockchain.

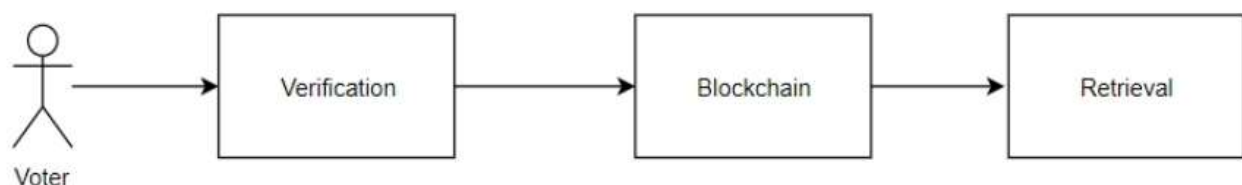


Fig 1: Basic structure of the Blockchain election voting process

### 1.1 Project Idea

An election is an important tool of a democratic country, which empowers the people to elect their choice of governance. Although numerous efforts have been made by the Election Commission to secure the integrity of citizens by having tamper-proof devices like Electronic Voting Machines, there are still many reported cases to date regarding the rigging of EVM and other breaches

in the digital system. Also, the issue of abstention is persistent as people are unable to cast their votes because they are unable to travel back to their constituency, because of which public lifestyle is affected for days.

Our proposed idea “Blockmat” is aimed at addressing the aforementioned issues by creating a decentralized voting system with smart contracts based on the Ethereum blockchain platform. The name “Blockmat” is an amalgamation of the words “Blockchain” on which the platform will be built and “mat” derived from the Hindi word Matdan(मतदान) which means to vote.

The voting system along with the use of Asymmetric encryption with private and public keys will ensure establishing the basic principles of voting such as

- 1) Only registered voters can vote
- 2) Voters can only cast their votes and not on behalf of someone else.
- 3) Every voter can only vote once
- 4) Once the ballot is cast, it can't be muted.

The Above mentioned principles can ensure the security and integrity of the votes and form the basic structure of fair voting. Hashing algorithms such as Sha 256 will be used to further make the blocks immutable. Tampering with a single block in the Blockchain will change the hash value of the Block making the other connected hash detect the intrusion. The use of the Consensus of the Ethereum network will mean faster electoral process updates. As the votes will be rejected or verified based on the decentralized chain of systems in real-time.

The proposed system can create trust in the citizens towards the election procedure.

## 2.0 Proposed System

Our proposed system aims at creating a mobile-based application that will be used by the voter and curated by the election commission of India. The user needs to reach a designated location decided by the polling officer of the area. Through the mobile app, the user can log in by completing the required authentication. Once verified the user can then select the election link and go to the candidate page. After selecting the candidate and entering the unique voter id which will give the user an Ethereum token in their wallet. The user can then proceed to vote. successful completion of the voting process will take the user to the completion screen, where they can verify their transaction id to confirm whether the vote was indeed counted. This system ensures a transparent, secure, and convenient way of voting. Also, this system was developed taking into consideration that a large number of users will be naive users.

### 2.1 Framework

Blockchain is a distributed and decentralized ledger that is used to record transactions in an efficient and verifiable manner. The use of Blockchain in the E-voting system can ensure the security of votes by preventing modification of data stored in blocks using the cryptographic technique. Ethereum blockchain allows the use of smart contracts which are also immutable like blockchains. it can be used to create tamper-free voting calls to the blockchain. Ethereum-based blockchain is used to verify the transaction that is the act of voting. the user will be given only one token to vote. one vote will be equivalent to one token. The successful completion will result in the creation of blockchains that are unique and immutable.

solidity is a language used for creating Ethereum-based smart contracts. For testing and deploying the project remix ide is used. Any relevant or native developed idea can be used to deploy the contracts for better security and convenience as per the election conducting authority.

### 2.2 System Requirements

This section will provide the user the required specification of the hardware and software components on which the proposed system is to be implemented

#### 2.2.1 Hardware Requirements

minimum requirements that must be fulfilled by the hardware components. The hardware requirements are as follows: -

- A smart phone with
  - 1) Storage – minimum 200 megabytes free
  - 2) RAM – minimum 2 gigabytes
  - 3) Processor – minimum dual core

• A desktop with

- 1) RAM – minimum 4 gigabytes
- 2) Storage – minimum 100 gigabytes
- 3) Processor – minimum quad core or hexa core

## 2.2.2 Software Requirements

This subsection will provide the versions of software applications that must be installed.

The software requirements are as follows: -

For the proper working of the system we can list our assumptions and dependencies as follows:

- Metamask Browser Extension: Metamask is crypto wallet which allows users to manage their accounts and maintain their keys..
- Remix ide: used to deploy the solidity contract

## 2.3 Modules

Modularization Details

The project has been divided into many modules in which for every functionality we have designated modules. Any software comprises of many systems which contains several sub-systems and those sub-systems further contain their sub-systems.

1. Election Commission
2. Election Test
3. Voter module

## 2.4 Methodology

The user needs to visit the designated nodal center assigned by the election commission of India. At the nodal center, the user needs to connect to the network of the nodal center. This can be simply done by connecting through the WIFI of the user's smartphone. Once connected the user will be able to login and see the election link. By clicking on the election link the user will be redirected to the candidate page. the user can select the candidate and enter their special voter address. if the voter address is correct then the user will be given a token and his/her vote will be cast digitally. successful completion of the vote will take the user to the review page to check their transaction id which will confirm that the vote has been cast.



### 3.0 Result and discussions

In this section we show our project’s demo as a proof of concept. In our testing we have used remix ide to run the solidity contract and have used metamask to generate tokens. both of the above can be swapped with other equivalent and convenient technology as per the governing authority of the election body. The app developed using flutter.

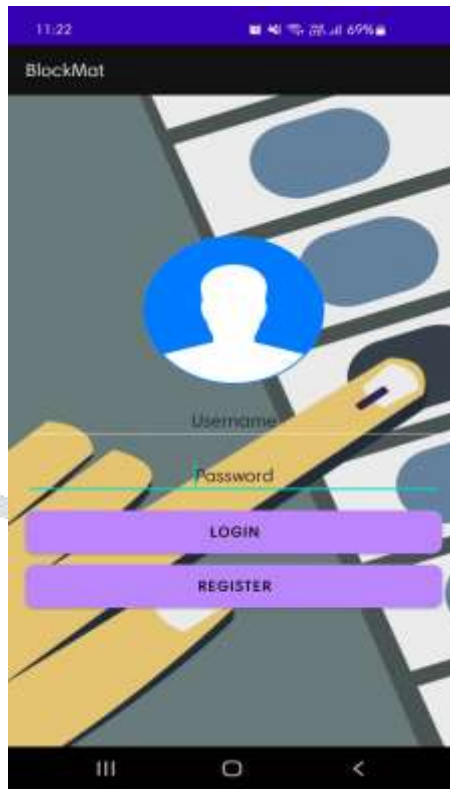


Fig 2: Login page

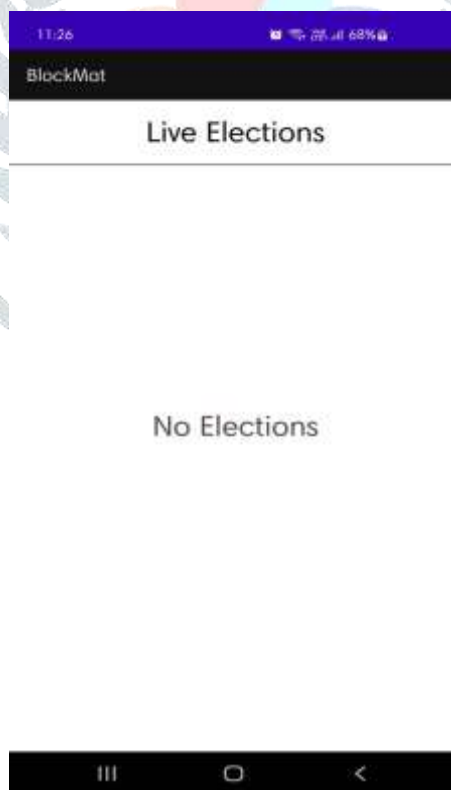


Fig 3: Election link if the voter is not connected to the nodal center network.

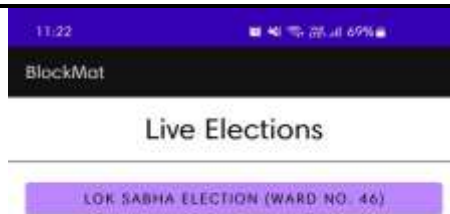


Fig 4: when the candidate is connected to the nodal center network.

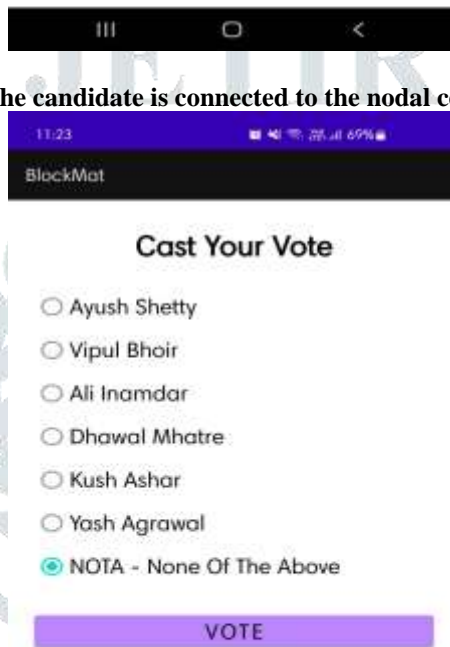
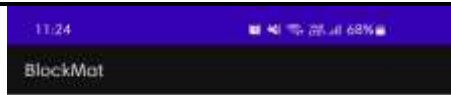


Fig 5: list of candidates



Enter Your Special Voter Token:  
0xDf98deED3CC928b03319f971326904601F368

SUBMIT

GO BACK

Fig 6: Candidate entering their special voter address



Fig 7: Candidate at the last page with transaction id.

#### 4.0 CONCLUSION

Every country faces significant difficulties in protecting security and maintaining the integrity of its user's votes. To ensure the participation of the voter, the integrity of the data, and faster counting of votes without tampering, a blockchain-based voting system using smart contracts has been proposed. The proposed system is "BLOCKMAT" where the Smart contract performs the authentication and verification process of voters and plays a role in selecting a Miner in the Blockchain to reduce the computational cost. It also counts the votes in real time which significantly reduces the time consumption. This system provides the citizens a platform to cast their votes using online devices. This will help to increase the number of voters in order to achieve the country's democracy.

#### REFERENCES

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