Vote from Home: An Immutable Legitimate Blockchain Based E-Voting System

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ABSTRACT: Security is always the biggest concern when implementing digital voting system. Voting system should be fair, transparent and secured for a better democracy. The proposed system avoids manual registration and provides higher degree of transparency as well as immutability. It is based on Aadhar card using which the user gets authenticated and can cast their vote. The details of Aadhar holder is maintained by Administrator. The system will check the eligibility of the user by verifying the Aadhar card document and also checks that the user is not voted yet. If the user is valid, a One Time Password will be sent to the user's email id/ mobile number as an Electronic Mail/SMS using which the user will get authenticated and can cast their vote. After casting their vote, the Blockchain technology comes into existence which avoids tampering of votes. After casting the vote, it cannot be changed. By implementing the block chain technology, the system will avoid the proxy casting and recasting. If any of the data get changed, it can be easily detected since they are interconnected to each other. Blockchain is a form of distributed database where each record takes the form of transaction. A block is a collection of these transactions. With help of Blockchain a secure and robust system for digital voting can be devised.

KEYWORDS: Advanced Encryption Standard (AES); Blockchain; Secure Hash Algorithm (SHA-256).

I. INTRODUCTION

Voting process is increasingly challenged by the burgeoning power of Internet. There could be chance of cheating at the time of voting process due to lack of transparency. Blockchain technology is one solution that can be used to reduce the problems that occur in voting. The paper proposes a novel "Electronic voting system based on the Blockchain" that addresses some limitations in the existing systems. The Blockchain technique embraces a decentralized system and the entire databases are owned by many users. Here the users can make use of Aadhar card to cast the vote since Aadhar is mandatory in India and it has all the details of the user. The Admin generates the lists which contain details of all the users who are 18 years and above. Blockchain technology is implemented to check if the vote is recorded as it is without any modification and avoids tampering of votes.

CHARACTERISTICS:
(i)   **Immutability:** Any proposed "new block" to the ledger must reference the previous version of the ledger.
(ii) **Verifiability:** The ledger is decentralized, replicated and distributed over multiple locations. This ensures high availability (by eliminating a single point of failure) and provides third-party verifiability as all nodes maintain the consensus version of the ledger.
(iii) **Distributed consensus:** A distributed consensus protocol to determine who can append the next new transaction to the ledger. A majority of the network nodes must reach a consensus before any new proposed block of entries become a permanent part of the ledger.

II. RELATED WORK

[Ahmed Ben Ayed, 2017]

Implementing the technology that avoids any kind of security pitfall is highly essential to gain the trustworthiness from the people. The system allows only registered people to cast their vote. The system will verify voter's identity against previously verified database and let them vote only once. Hence, it avoids recasting of vote. After casting of vote, it will be stored in the Blockchain which will be more secure, reliable and help in increasing the voting percentage. The major advantage with this system is that it gains trustworthiness from the people by providing highly secured voting system. And also the system is highly transparent and unchangeable.

[Patrick McCorry, et.al, 2017]

This system implements self-tallying protocol in which each user can perform tallying of vote and has open vote network protocol in which each user is each voter is in control of the privacy of their vote which improves the transparency. The data stored is not only just immutable or transparent but also it is easily accessible. This means that the system is not only secured but also it is more efficient.

[Friðrik Þ. Hjálmarsson, et.al, 2018]

The system implements Blockchain technology for secured, distributed electronic voting. Provides transparency, security by secured authentication, avoids tampering of vote. Each vote will be stored in the Blockchain and each user will receive transaction id for the verifying the vote. The major advantage with this system is that the system is highly transparent which means that any user within that particular network can be able to see that. The system remains immutable which means that once the data is entered it cannot be altered. This system also avoids tampering of vote.

III. PROPOSED System

The proposed system avoids manual registration process. It is based on Aadhar card using which the user gets authenticated and can casttheir vote. The details of the Aadhar card holder are maintained by Admin. Thesystem will check the eligibility of the user by verifying the Aadhar card document. If the user is valid, a ONE TIME PASSWORD will be sent to the user'sElectronic Mail/mobile number as a mail/SMS using which the user will get authenticated and can cast their vote. Once they cast their vote, the Blockchain technology comes into existence which avoids tampering of votes. Byimplementing the block chain technology, the system will avoid the proxycasting and recasting. If any of the data get changed, it can be easilydetected since they are interconnected to each other. Blockchain is a form ofdistributed database where record takes the form of transaction. A block is acollection of these transactions. With help of Blockchain a secure and robustsystem for digital voting can be coined.

ADVANTAGES:
1) Tampering of votes can't be done
2) Prohibition of proxy casting and re-casting
3) Secured voting process
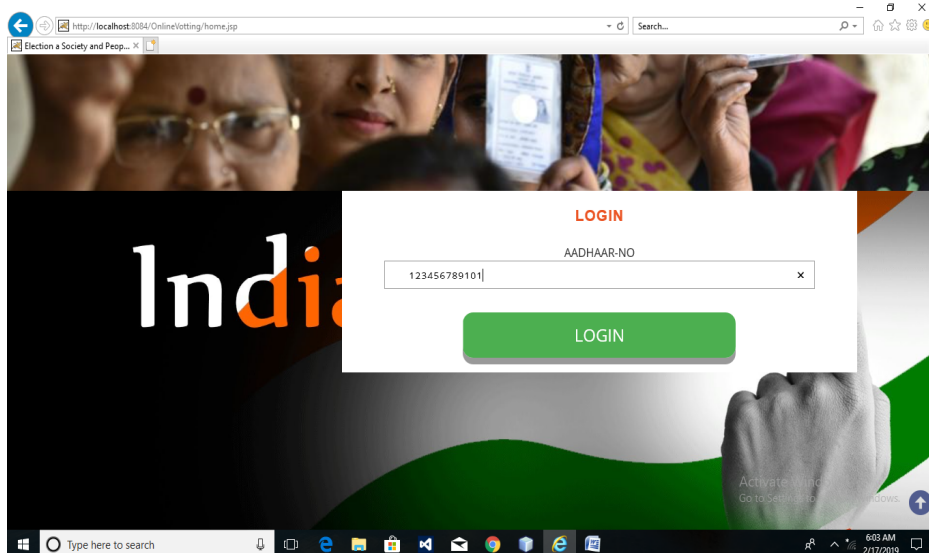4) Vote can't be re-casted

OVERVIEW:

Blockchain technology is one solution that can be used to reduce the problems that occur in voting. Blockchain based voting system using Aadhar card helps to keep away voter fraud by providing a clear record of the votes and it prevents tampering of any vote.

An OTP is sent to theuser's registered mobile number with which the user can cast their vote. Theuser data will be collected from the Aadhar database using with the user datacan be authenticated. The user's vote gets sent to one of the nodes on thesystem, and the node then adds the vote to the Blockchain. To ensure that thesystem is secure, the block will contain the previous voter's information. Ifany of the block's data get changed, then it would be easy to find since all blocks are interconnected to each other. Hence, data cannot be altered andno failure exists.
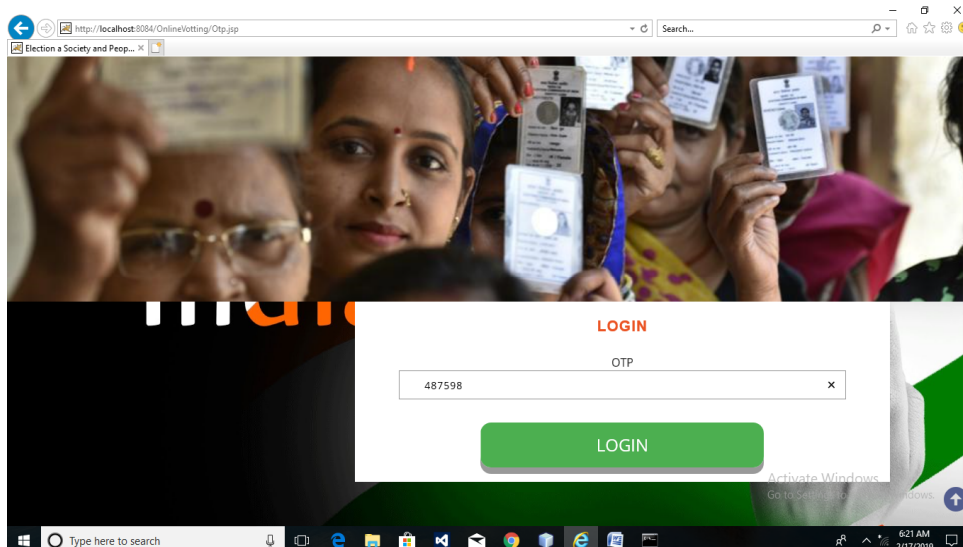
LIST OF MODULES:

1. User Registration
2. Voting server
3. Candidate registration
4. Block chain formation
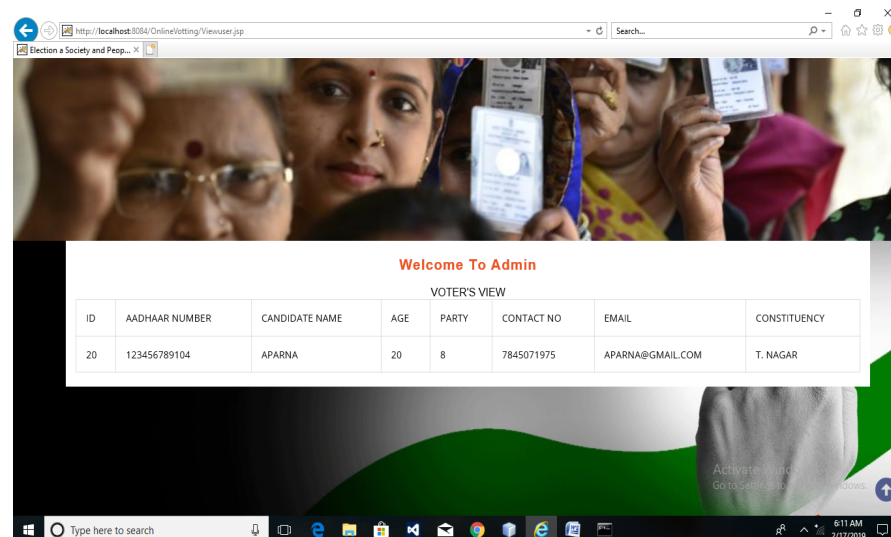5. Verification
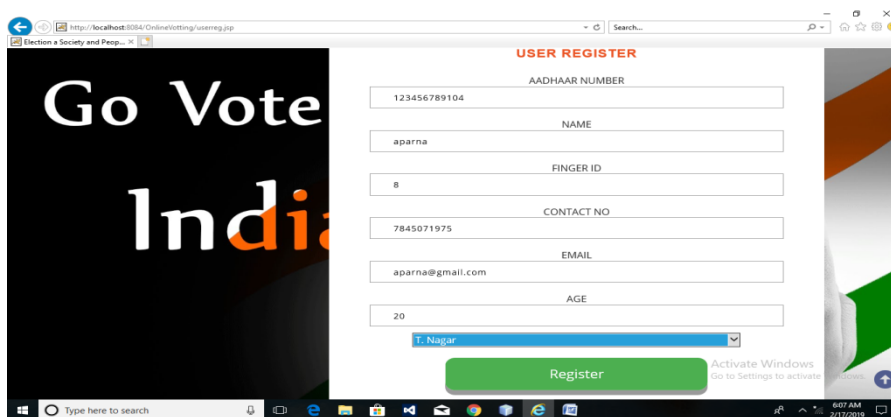
USER REGISTRATION:

In this module Admin registers the valid users, they are allowed to login into their account to access the application. All these details will be stored in server. Admin registers the user details along with their Aadhar number integrated with an Electronic mail.

VOTING SERVER:

The Server maintain a database of voter's information and verify them if required. It will update new voter's details in its database. The Server will authenticate each voter by Aadhar before they access the Application so that the user can access the Application

CANDIDATE REGISTRATION:

In this module admin will register the candidate using their Aadhar number. Candidate registration will be made using Aadhar number and constituency of that candidate. If user candidate provide improper information, system will discard the registration process.

BLOCKCHAIN FORMATION:

A block is a container data structure. Here every certificates number will be created as a block. For every block a hash code will be generated for security. Here voting information will be stored on block chain. If we store the information on Blockchain it is more secured and every block is created based on constituency.

VERIFICATION:

In this user will get ONE TIME PASSWORD after they polled the vote. ONE TIME PASSWORD is the purpose for confirmation of vote. When user poll the vote, a ONE TIME PASSWORD will be sent to the user verification, after the confirmation of ONE TIME PASSWORD, System will update vote on database.

IV. SCOPE

i.   Increasing number of voters as individuals will find it easier and more convenient to vote.
ii.   Secure and transparent voting system using tamper-proof personal id.
iii.   Saves time and reduces human intervention.
iv.   The system is more flexible and highly secure.
v.   Unique Identification of voter through Aadhar number.
vi.   No fraud vote can be submitted.
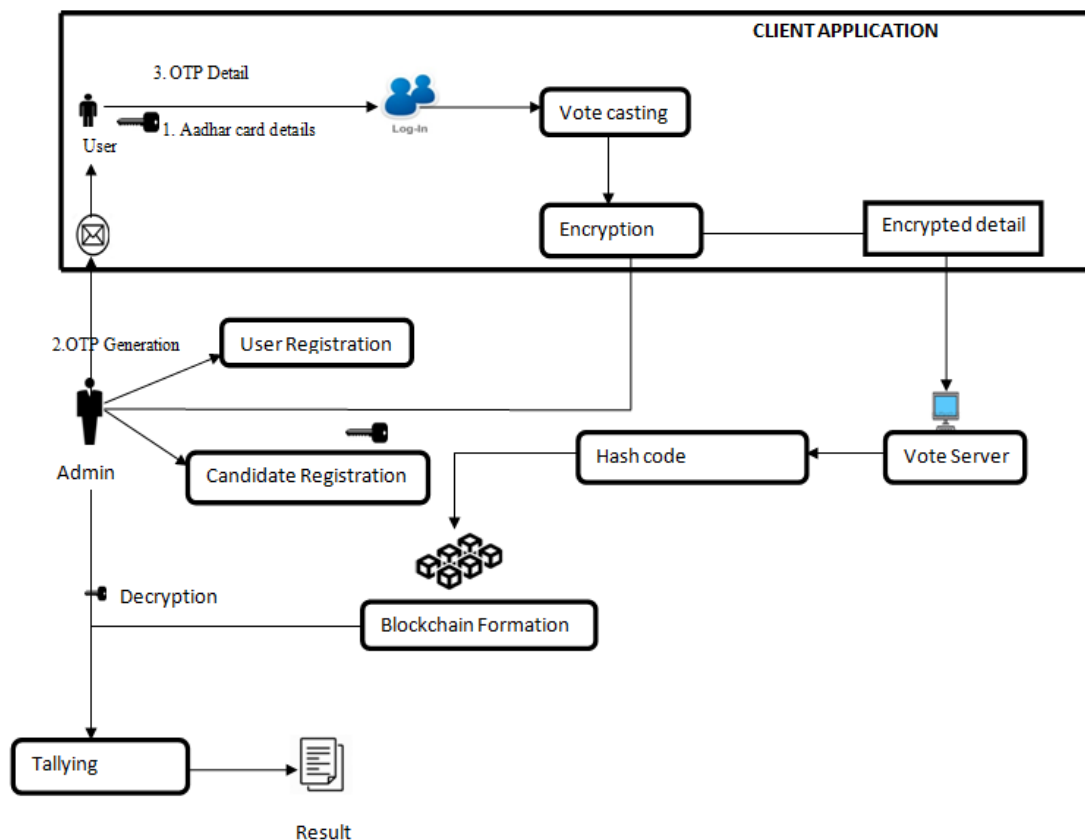
V. ARCHITECTURAL DIAGRAM

The user enters their Aadhar card details to the system. All the user details will be processed and maintained by the Administrator. The administrator will validate the user details by checking the database of valid users. After validation, the user will receive a One Time Password through Electronic mail or through Message which is generated by the Administrator. The user has to provide these details and can cast their vote. All these details will get encrypted with the help of AES (Advanced Encryption Standard) algorithm and will be stored in the server. The Administrator will be responsible for registering the user details and candidate details. Now the Blockchain technology takes its role in which all the details will be stored in the form of blocks. A hash code will be generated for each block which acts as a signature for that particular block. Hash code contains the details about the current block as well as the previous block which will create a link to the previous block which can be done with the help of Secure Hash Algorithm (SHA-256). Thus, to calculate the result the details will get decrypted and the votes will be counted.

VI. CONCLUSION AND FUTURE WORK

Voting is an important process as choosing a right leader is highly essential which decides the fate of a nation. Implementing the technology that avoids corruption is highly essential to gain the trustworthiness among people. Our proposed system is based on Blockchain technology which will ensuretransparency as well as making the system tamper proof. The corruption in the voting is reduced and the result can be computed at the faster rate. The Aadhar card is must in India and everyone will possess the Aadhar card. Hence, thiswill be easy to implement in real time. Thus, by bringing this kind oftechnology the voting percentage can be increased.

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