



IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY



VOLUME : 3 ISSUE : 09 Print / Issue Publication Date: 27-May-2019



ISSN : 2455-2143



Indexed In



WWW.IJEAST.COM

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PREVENTION OF VOTER FRAUD USING BLOCK CHAIN

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Abstract— Voter Fraud without a doubt has been catastrophic at so many levels. The wrong leader makes wrong decisions which starts a domino effect of bad decisions thereby affecting the nation. The aim here is to establish trust between the citizens of the nation and their elected leaders from various political parties. ‘Bitcoin’ has lately been the buzzword, but the real buzzword should have been ‘Blockchain’. Blockchain runs on the basic philosophy of Trust and Security which are the core essentials of a voting system in a democratic country. Here, we introduce an effective concept to solve the major issue of voter frauds in our country. This concept is not only bound to our country - India but also applicable to every country across the globe.

Keywords— Blockchain, India, Security, Voter, Frauds

I. INTRODUCTION

Our constitution gives us the right to vote and voting is a very crucial aspect of the progression of a country. It is the most basic civil right on which all other rights of the people may depend. When selecting a municipality counselor or even the Prime Minister of a country, every constituent should be able to trust the procedure and outcomes, or it would be a loss of democracy. Election integrity is essential, and security of the votes should not be weak. It is obligatory upon the state governments to protect the elections and ensure that every vote is secured when voted through ballot papers or EVMs.

Any meddling with the votes or the election results is considered as a voter fraud. Frauds also include buying votes, violence against the constituents, mis-recording of votes, destructions of ballots and tampering of electronic voting machines. These all are the setbacks of free and fair elections which result in the failure of a democratic country. A free and fair election is one of the main pillars of

democracy, which should never be conceded. In India, EVMs were introduced 1998 on an experimental basis for the first time in assembly elections, with the objective of reducing the polling frauds [18]. But again, EVMs have their disadvantages also, it has got easier to tamper with it, as it is an electronic device any professional with a right skill set can bring it down to its knees.

Technology has evolved so much in many years, we now have better machines that can be used for multiple processes. A concept such as Blockchain is in huge limelight nowadays, it can provide us with lots of solutions and can also condense our problems concerning electoral deceptions in India and in many other countries. Blockchain can be considered as a ledger which is decentralized, i.e., it is not stored in a single place but it is distributed all over the network. It allows the authorities to keep track of all the transactions without keeping a central record. Doing so creates an inefaceable record that cannot be tampered and the record's legitimacy can be verified by every citizen using the blockchain instead of a single centralized authority.

In this paper we try to provide a feasible solution for the voting frauds happening around in the world.

II. WHAT IS VOTER FRAUD?

The basic overview of voter frauds is, any meddling with the votes or the election results is considered as a voter fraud. Frauds also include buying votes, violence against the constituents, mis-recording of votes, destructions of ballots and tampering of electronic voting machines.

In a democracy, voter frauds lead to the destruction of the country's future by mis-recording the votes and selecting the inappropriate representative of the people which in turn may lead to corruption.

There are lots of instances where voter frauds were recorded.



2.1 Examples

Delhi hit by a massive poll scam

In 2013, the Office of the Delhi Chief Election Commissioner has uncovered a massive scam which involved forged documents to obtain voter id cards for Bangladeshi Nationals and they also found 80,000 voter cards belonging to dead people. 13 lakhs of bogus voters were found. [17]

Electoral frauds in the UK

The Electoral Commission collects and analyzes data from the Police forces about cases of Electoral Frauds in the UK. These frauds include nomination, administration, voting frauds and etc. According to 2016 data, 30.66% of the frauds were voting frauds. Figure 1 shows various types frauds in the elections in the UK in year 2016 [16]

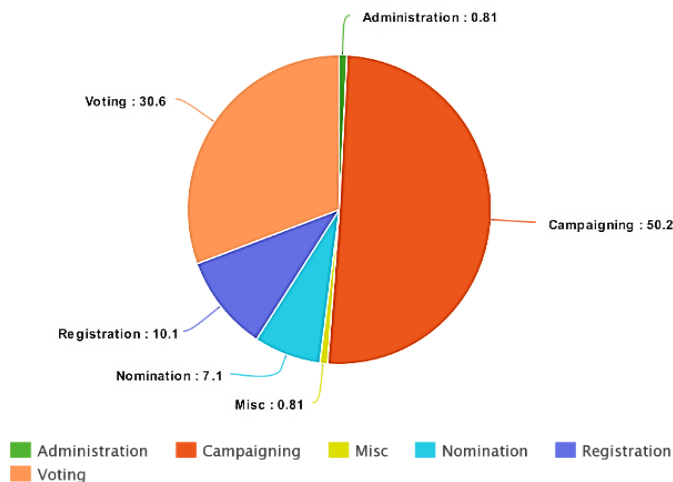


Figure 1

Voter Frauds In USA

In 2014, a non-citizen was charged with two voter frauds, one in general elections and another in Republican primary runoff. The accused was found guilty and sentenced to eight years following the possibility of deportation. [19]

III. EVM

Electronic voting machine or EVM is a device used for recording votes. EVM consists of two parts – a control unit and a ballot unit and they both are connected [18]. Earlier the votes were cast using the ballot paper which had various disadvantages, so, EVM was introduced as the solution for the shortcomings of the ballot paper method of voting. In India, EVMs were introduced in 1998 and were used on an experimental basis in 16 constituencies in various states.

There are lots of discussion over its security and authenticity and it quite helped the government to organize fair elections, but in today's world, when technology is emerging rapidly, is it possible to keep these machines safe?

There was lot of criticism regarding the use of EVMs, Like- In 2004, a retired US-based professor, Satinath Choudhary, who was heading the "Better Democracy Forum" in New York filed a PIL to block the use of EVMs in India and stated- "Computer chips that control the EVMs can be easily programmed to all kinds of improper manipulations" (2017) [15].

In 2010, The authors of "Security Analysis of India's Electronic Voting Machines" Wolchok et al.(2010) [2] have shown various different ways to tamper with the EVM. Some of them are:

- Substituting look alike units
- Substituting CPU
- Tampering with software before CPU manufacture.

Recently, many allegations were made on the EVMs used in the past Elections and the Election commission has denied all of it. To our understanding, EVMs proved to be a better solution than its forerunner methods of voting but now we have more innovative and efficient technology which can be used as a more effective solution to our problems.

IV. WHAT IS BLOCKCHAIN?

The blockchain is the basic underlying technology behind the newly booming cryptocurrency. It is not a new technology but a combination of three existing technologies –

- 1) Peer to peer network
- 2) Cryptography
- 3) Decentralization

Blockchain technology is basically a secure peer to peer network which is decentralized. In Blockchain, information is stored in the form of blocks across its network. The contents of each block depend on the technology that is going to be used.

Since the information is stored in the form of identical cubes across the network –

- The blockchain cannot be controlled by a single entity.
- It has no single point of failure.

The blockchain network runs on a consensus protocol, every blockchain has a different consensus percentage which makes it the basis of any change that will occur on the blockchain. The two important properties that result from this are –

- Transparency: Data is embedded within the network as a whole.



- It cannot be corrupted altering any unit of information would mean using a huge amount of computer power.

The computers connected in a blockchain network are referred to as “Nodes”. Interconnected nodes make a blockchain, when a new node gets connected to the network, it gets a copy of a blockchain which gets downloaded automatically. The function of each node in the blockchain is to solve computational problems in order to verify transactions that occur in a blockchain.

The blockchain is a decentralized technology. Anything that happens on it is a function of the network as a whole. This makes blockchain technology robust and secures making it almost impossible to hack.

The (potential) applications of blockchain are endless, starting with the ongoing buzz of cryptocurrencies in the financial market to the wide array of technological booms it can offer.

4.1 The Ethereum blockchain

The Ethereum blockchain is a decentralized platform that runs automated programs known as smart contracts in the blockchain. The reason why Ethereum blockchain is unique is its very feature of programmable smart contracts that could add functionalities to the blockchain and help create truly decentralized applications that run on the blockchain or use the blockchain depending on their respective functionalities. When a smart contract runs on a blockchain, it operates like a self-running computer program that executes automatically when specific requirements are met. Ethereum allows developers program whatever they want to create.

This special feature of smart contracts is what makes Ethereum blockchain the apt choice for creating the new blockchain based voting system that can effectively which has further been broadly explained in our blueprint.

The smart-contracts based voting system will be very hard to tamper with, it will provide an infinitely more secure system. Ledger-protected votes would require lots of manpower and computer skills. No one has that much computing power, so it would be very difficult to crack the system. Smart contracts could also help to turn up more voters.

V. REPRESENTATION OF OUR SYSTEM

Our e-Voting solution will include four main requirements that can be illustrated as shown below:

Authentication: it will check the authenticity of the Voter by their Aadhaar card details and biometrics.

Anonymity: it will always protect the identity of the voter before and after the elections, their details will not be disclosed.

Accuracy: votes must be accurate.

Verifiability: The system should be verifiable to make sure all votes are counted correctly.

Figure 2 shows the representation of our system.

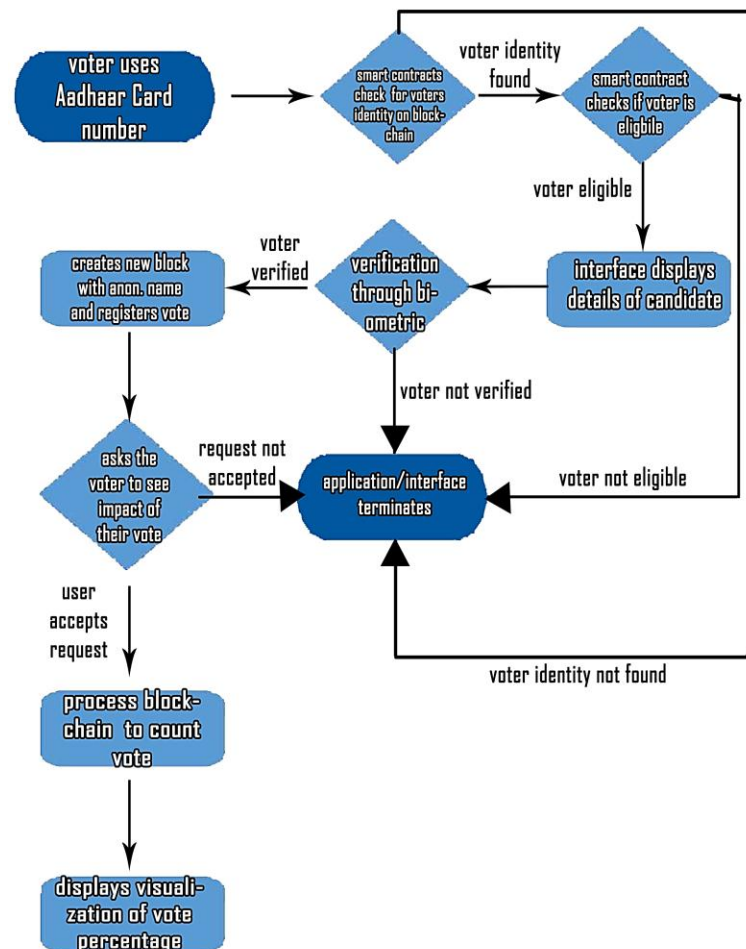


figure 2

5.1 Requesting to vote

The voter will have to log in to the voting system, using his Aadhaar card ID, then smart contracts will check for the voter’s identity on the blockchain. If the voter’s identity is found on the blockchain, the smart contracts will now check if the voter is eligible to vote or not, else the application will terminate. Once it identifies that the voter is eligible to vote, it will guide the user to undergo a biometric scan of



the user to confirm the authenticity of the voter, else application will terminate. If the biometric scan doesn't match with the one stored on the blockchain, the application will terminate.

5.2 Casting vote

After the biometric scan, if the scan matched with the one stored on the blockchain, the user will be processed to next step where they will get a list of candidates, participating in the elections. The user will choose whom to vote and the smart contract will create a new block with anonymous name and register the vote.

After the vote has been cast, the user will be requested to see to which candidate their vote went, and how this vote will be affecting the results of the elections. If the user accepts the request, the application will show the details of the candidate according to the user's vote and it will also process blockchain to count the votes and display a visualization of the total vote percentage.

5.3 Check for the vote

After the vote has been cast, the user will be requested to see to which candidate their vote went, and how this vote will be affecting the results of the elections. If the user accepts the request, the application will show the details of the candidate according to the user's vote and it will also process blockchain to count the votes and display a visualization of the total vote percentage.

VI. LIMITATIONS

There may be CONCUSSES in the blockchain, but that can be solved using the longest chain method. Ben Ayed et al. (2017) [12].

We are assuming that there will be full power backup and good systems.

VII. CONCLUSION

We have proposed a voting system based on the Blockchain and smart contracts technology, using the blockchain is a great fit in matters of public records as many transactions are already happening using the blockchain as it distributed and publicly verifiable, and these are some of the properties that makes it apt for use as a voting system.

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2455-2143