DECENTRALIZED ELECTRONIC VOTING SYSTEM

Digital Assignment 2

Submitted by

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Introduction:

The Indian democracy is the largest democracy in the world, the people consider this as a huge festival where everyone believes that they have their own opinion with respect to the leaders who are going to represent our country on the world stage. Every year new voters become eligible to take part in this huge festival, these months of voting will essentially show us the path on which the country will be moving towards in the next few years. This shows how important an election is in terms of the growth of a country and its people.

There are various disadvantages of the current voting systems, one of the major one is the count of a smaller number of people who are coming out to voice their opinions by using their voting powers. The reason for low count is that a major chunk of our population lives in remote places where the access is not easy for the authorities. This problem can be solved by using an E-Voting System that introduces the voters to a new system which just requires a device and a network connection to cast the votes of the voters. Since we are living in this technology era where almost every corner has the access to the required devices with a stable network connection, but even this system has some flaws with major one being anonymity of the users. The users are still not anonymous and the leaders can rig the voters by foul play. This is where we introduce blockchain to solve the issue of privacy and security.

The current technological revolution is related to introduction of blockchain, decentralization, trust less networks. This technology can help us in removing those ill methods from the scene of Indian democracy by making the voters anonymous from the leaders and their organizations. Since there is no centralized authority in this proposed system, the blockchain network makes sure that the election starts, and ends at the concerned time with security, anonymity being the major objective of the election.

Objectives:

We are devising the following architecture which ensures:

- **Decentralized System:**

  There is no centralized authority in the blockchain world, community is the only leader where everyone can voice their opinion. Which is apparently also the objective of democracy.

- **Trust less Network:**

  The world has been reminded again and again that way more trust on one person, group of persons or organization can result into destruction. 2008 recession, Zimbabwe Inflation, Colombia Fall of government are some of the perfect yet unfortunate example of how trust can be misused by a certain section of people.

- **Privacy:**

  There have been times when a voter faces the consequences of not voting for a specific leader as they get to know the identity of the voters and eventually use their muscle power to gain some illegal advantage on the election.

- **Security:**

  There have been various events where users' private data have been compromised as they are being stored/governed by a single authority. Blockchain solves this issue by maintaining a public ledger and make the transaction, data stored irreversible in nature.

Gaps Identified:

1) The papers and works that have proposed decentralized e-voting systems are relatively low in number and most of them reflect the same architecture of smart-contract to ensure votes are not mis-used and are in time, in location during any election. But, most of the proposed architectures fail to ensure the anonymity of any user and anonymity of voting is biggest perk of any democracy. Thus, these works, despite being error-proof, cannot be used as our voting architecture.
2) The works that proposed anonymity can still be prone to it. With bitcoin architecture, the revelation of identity of any person is not that easy, but is not impossible either. Since all the transactions in decentralized architecture is open to anyone, it is highly possible that candidates can study each transaction and trace it back to the public key of any user, which would eventually lead to the voters. In one of our studied papers, we found out a very clever way to get over this issue, the way being is to use mixers, set-up by election commission itself to ensure that votes don't get traced back to the user and are combined with other voters' votes.
3) The older architecture of e-voting system is reliant on a single organization/authority. It is a well-known fact that centralized authority can easily be rigged owing to the fact that even Election Commission of India is blamed at after any election result, hence reliance on any other central authority to set-up this system of E-Voting is highly impossible.
4) The E-voting system architecture, irrespective of methodology deployed, is subject to network toppling, which can be done by any powerful leader if he/she knows that voting can affect his/her chances adversely.
5) Centralized E-Voting servers, can be subject to various network attacks which includes attacks like Distributed Denial of Service Attack (DDoS), SQL Injection etc.