

E- Voting System

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Abstract: - The election system is the pillar of the every democracy. The democratic administration is totally dependent on the results of the election. The election process provides the right to every citizen of a country to choose from a list, to elect or to determine. The main goal of voting (in a scenario involving the citizens of a given country) is to come up with leaders of the people's choice. Who can guide the democratic system towards the welfare of the society? The voting system has observed many effective changes over the past few decades, right from the traditional paper ballot voting to electronic voting and now towards the online voting. The voting system is improving step by step, advancement in the new system eliminates the drawbacks of the previous system. Every system tries to overcome the loop holes of the previous system. The primary goal of this paper is to understand the traditional voting system with the recently proposed voting system. One hopes that in this way the voting process becomes faster, cheaper, more convenient, and also more secure.

Keywords:-Electronic Voting, Authentication, EML, security.

1.INTRODUCTION:

In India election has supreme weight age. So to make it secured and efficient in the vision of modern technology we are "Global Wireless E- Voting. Voting is a process at the heart of a democratic society. Voting schemes have evolved from counting hands in early days, to systems that include paper, punch card, mechanical lever, and optical-scan machines. Internet census takes precautions to prevent people from stuffing the ballot box; they generally do so at the expense of voter privacy.

Elections were made traditionally; organizers determine who is eligible to vote. This may involve a formal registration period or an announcement that anyone who is a member of a certain group as of a certain time may vote. Once the election begins, administrators may validate the credentials of those attempting to vote. This way could involve asking voters for identification cards or passwords. Generally, this procedure also

involves keeping track of who has already voted so that eligible voters may vote only once. Moreover, the traditional way of voting generates mores constraints; election fraud could be prevented by using physical security measures.

2.Electronic Voting System:

An electronic voting system is a type of voting system which uses electronic ballot that would allow voters to broadcast their secret vote ballot to election officials over the internet. With the prosperity of internet over the years, inventers start to make the use of electronic voting in order to make the voting process more convenient and to raise the participation of the civic. From now on, engineers have repeatedly created new technology to improve the feasibility of electronic voting system.

Electronic elections gain more and more public interest. Some countries offer their citizens to participate in elections using electronic channels. E voting is generally any type of voting that involves electronic means [9]. The letter E is associated with anything that involves web based or computers these days. However, the terminology of E-voting is nascent, and a crucial distinction lies between the various different ways in which voters can vote.

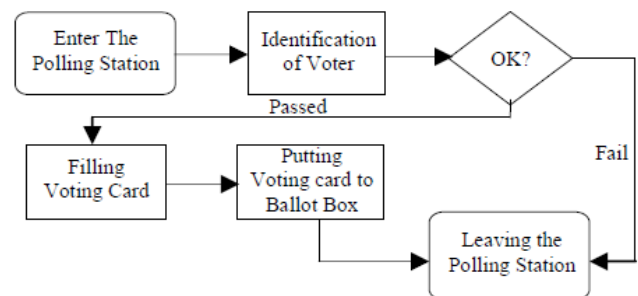


Fig: 1. Classical voting process

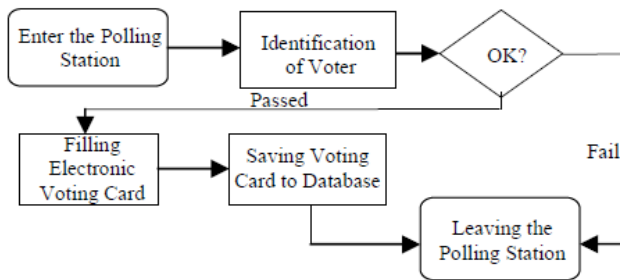


Fig 2. In the site E voting system

3. Requirements in E-Voting

A voting system should satisfy these requirements:

- Eligibility and authentication – only registered voters must be admitted.
- Uniqueness – no voter may cast his vote more than once.
- Accuracy – voting systems should record the votes correctly.
- Verifiability and audit ability – it should be possible to verify that all votes have been correctly accounted for in the final tally, and there should be reliable and verifiably authentic election records.
- Secrecy – no one should be able to determine how any individual voted.
- Non-coercibility – voters should not be able to prove to others how they voted; otherwise vote selling and coercion would be facilitated.
- Minimum skill requirement for voter
- Minimal requirement of equipment
- Minimum Time required for vote

4. Concept of an E-Voting System

A conventional perspective, E-voting can be split up into three phases:

- Pre-Voting Phase.
- Voting Phase.
- Post-Voting Phase.

Considering E-voting systems this way follows the high level models of election systems given

by The Organization for the Advancement of Structured Information Standards (OASIS). The OASIS consortium specifies a so called Election Mark-up Language (EML) especially for the exchange of data within E-voting processes. Therefore, OASIS drafts a high level overview and a high level model dealing with the human view and a high level model

4.1. Pre-Voting Phase

As depicted in the human view of the OASIS high level model shown in Figure 4, the major tasks provided within this phase are.

- Candidate Nomination Process: There might be various ways to become nominated as a candidate to be elected depending on the national legislative. A candidate has to meet some legal restrictions, e.g., he must be old enough, etc., the candidate suggested might have to accept his nomination, he has to decide whether to accept or decline his nomination. Finally, nomination process results in a list containing all candidates, the so called candidate list. The EML model considers referenda as well. Thus, the model includes the referendum options nomination process in parallel to the candidate nomination process [15]. In principle, they are quite similar beside the different legislative restrictions. Even the options nomination process leads to a resulting options list. In this paper we limit our scope only to elections.
- Voter Registration Process: Depending on the local laws, voters have to register for voting explicitly. On the other hand, in many countries citizens are registered for voting automatically. However, the result of this process is an election list containing all persons allowed to vote.

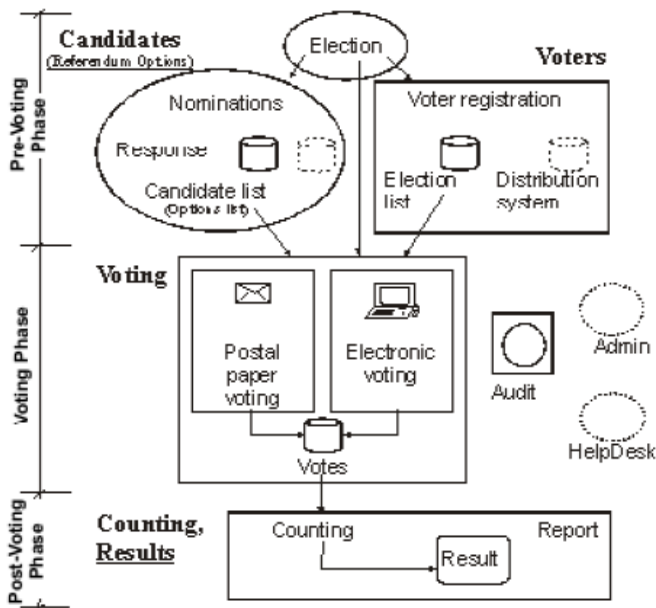


Fig 3. The human model stated by EML

4.2 Voting Phase

Based on the results of the pre-voting phase, the voting phase enables all eligible voters to make their decisions and cast their votes. Thus, by the use of the election list the voter has to authenticate herself as an eligible voter and he has to cast his individual vote. Since the voter should have an alternative to E-voting and since conventional voting with paper ballots must be provided in parallel, the model has to consider multiple possibilities. Especially the interfaces and cutting edges between electronic and conventional elections have to be considered in the conceptual design.

4.3 Post-Voting Phase

The post-voting phase deals with the juicy bites of the E-voting process. This phase covers counting and result reporting mainly.

- **Counting:** Counting is one of the most critical steps. Here, the possibility of recounting must be considered as well. Therefore, counting has to be returnable and the input needed, such as the cast votes in particular, have to be archived.

- **Result:** Close to the counting mechanisms, an analysis system is needed. Such a system provides the auditing team and the election officials with various reports. One of the most important reports is of course the final result of the counting. The form and the precise schema of such reports are out of scope of the model provided by EML.

- **Audit Administration:** Beside the phases and roles given above, there are some other important actors and elements in the model. Very important are the audit mechanisms needed along all phases of an election. On the one hand, it is important to have possibilities to prove the correctness of the process as such. On the other hand, it is crucial to do not violate the main principles and security requirements, keeping a vote an inviolable secret in particular. However, audit is necessary to prove the authenticity of the result of the election. Thus, a special set of persons, e.g., election officials and Candidate's representatives, should be allowed to gain access to auditing information.

System administration is critical as well, since administrators are allowed to access the system. Nevertheless, administration is necessary and therefore the security concept of the E-voting system has to protect critical data and components, the secrecy of the ballots especially. This affects the organizational aspects of the security concept either. Not only technical security mechanisms can guarantee this. The administrative staff has to be elected in respect to reliability as well.

5. Authentications Schemes

In literature, some researchers have suggested that physical and logical access to the voting systems should be based on credential and rights granted either on role based or need to know policy. Voters and administrators must gain access with nontrivial authentication mechanisms that may require use of smartcards for stronger security. In Estonian E-voting System the national Public Key Infrastructure is applied and voters use their authentication and digital signature certificates for casting votes. In Secure Electronic Registration

and Voting Experiment, performed in the United States of America, it is possible to vote any time within 30 days before the election day until the closing time of polls on the election day. Every voter can vote only once. There are no public key infrastructure and ID-cards used in SERVE.

However, some authentications schemes which offer a strong authentication require either a user to memorize complex credentials or they are technically expensive in monetary and privacy terms. This is because users may be required to buy end user authentication devices like cryptographic calculators and biometric readers; additionally, transfer of biometric data over public networks raises privacy concerns on the side of users.

6. Technical and Secure Attributes of a Good E-Voting System

The following is a description of desirable Characteristics that should exist in any good E-voting system and the reason for each characteristic with respect to the voting process.

6.1. Accuracy

“A system is accurate if 1). It is not possible for a vote to be altered, 2). It is not possible for a validated vote to be eliminated from the final tally, 3). It is not possible for an invalid vote to be counted in the final tally. Accuracy is one of the most important factors to any system. If the input is not correct, then the result will not be correct. Not only should the system be accurate in counting votes and maintaining the integrity of cast ballots, the system should be accurate in identifying voters.

6.2. Verifiability

“A system is verifiable if anyone can independently verify that all votes have been counted correctly”

Currently, many experts believe that the best method to verify votes and perform recounts is with paper ballots. In addition, the voter should be able to verify that their ballot is entered correctly and allow them to adjust their vote if necessary.

The process needs to verify the validity of the voter as well. Perhaps the use of a nationwide database of registered voters' information and a method of non-intrusive biometrics could identify participants. The system should also, verify that the E-voting system has not been compromised.

6.3. Democracy

“A system is democratic if 1). It permits only eligible voters to vote and 2). It ensures that each eligible voter can vote only once”. This characteristic can be accomplished by incorporating accuracy and verifiability. Currently, many counties require that voters vote in their own precinct so, that they can sign their name in the approved voter list. Some counties have implemented a database that tracks voters. A voter must be able to show proof of their identity, the database is then updated, which prevents that voter from going to another precinct and voting again.

6.4. Privacy

Privacy is one of the most important properties of an information system must satisfy, in which systems the need to share information among different, not trusted entities. “A system is private if 1). Neither election authorities nor anyone else can link any ballot to the voter who cast it and 2). No voter can prove that he or she voted in a particular way”. Privacy is a concern to all users of a voting system. While it is important to have an audit trail available to verify the system, aggregate data should be accessible as opposed to an individual's vote. Some voters have problems using the voting machines, this requires that a staff volunteer assists them and this can interfere with the privacy of the voter. “The second privacy factor is important for the prevention of vote buying and extortion. Voters can only sell their votes if they are able to prove to the buyer that they actually voted according to the buyer's wishes”.

6.5. Convenience

“A system is convenient if it allows voters to cast their votes quickly, in one session, and with minimal equipment or special skills”. The introduction of touch screens into the voting process was first used to aid the disabled population. This increased convenience of touch screens could lead to higher voter participation and decreased time at the polls. If the system utilizes technology that society is already comfortable using, voters will perceive the system to be more convenient.

6.6. Flexibility

“A system is flexible if it allows a variety of ballot

question formats, including open ended questions. Flexibility is important for write-in candidates and

some survey questions”. It is probably less common now for voters to write in candidate choices; however, the system should be dynamic especially in our ever-changing fast-paced society. Additionally, the system should be able to accept more than one method of input to accommodate both voters at the polls and absentee ballots.

6.7. Mobility

“A system is mobile if there are no restrictions (other than logistical ones) on the location from which a voter can cast a vote”. Mobility in the system could allow voters the capability of voting anywhere internet access is available. This characteristic is better suited for an online E-voting system. However, the designs of the physical machines need to be small enough to accommodate various polling locations where space could be an issue.

6.8. Reliability

A system is reliable if it performs and maintains its functions continuously. Reliability in the system requires that there be alternative methods should failure occur. For example, in the event of a power failure, the system should have an uninterruptible power source or an alternative paper method. Many polls did not open on time because of machines malfunctioning.

7.1 Advantages of Online Voting System

- **Portable:** It is very much portable system as the system works on internet only the internet supporting device is required.
- **Fast:** It is very fast as compare to traditional paper ballot voting system. The voter doesn't need to wait in long queue for voting. He /She can cast their vote just on a single click.
- **Flexibility:** As this system is functional on the internet that makes this system more flexible to support variety of paper ballot question formats.
- **Mobility:** This system gives the freedom of casting the vote from anywhere in country. This is beneficial for the voters who are regularly out of station.
- **Reusability:** The extent to which the existing application can be reused in new application. The system can be reused a number of times without any technical difficulties.

7.2 Disadvantages of Online Voting System

- **Complexity:** The designing phase of this system is highly complex. As the system has deal with large no of users and has to maintain huge database
- **Security Issues:** The whole system operates over the internet which makes the system more susceptible to online threats so the security issue is the main concern of this system.
- **High Expense:** This system is very much costlier than the other systems because various equipment's and utilities are required to be purchased which are quite costlier.

8. CONCLUSION

Over the last year, there has been strong interest in E-voting as a way to make voting more convenient and, it is expected, to increase participation in election process. E-voting systems are among those being considered to replace traditional voting system. E-voting may become the quickest, cheapest, and the most efficient way to administer election and count vote since it only

consists of simple process or procedure and require a few worker within the process. The main task of this contribution was to introduce the idea of the I-Voting systems. Security plays a major role in the development of any E-voting system. Availability, integrity, confidentiality, non-repudiation, and authentication are key areas in computer security;

by amalgamating these areas of security, together they form a cohesive bond that helps guarantee voter trust in E-voting system.

REFERENCES

- [1] Bellis M., The History of Voting Machines Inventors.
- [2] Cranor L. and Cytron R., "Design and Implementation of a Security-Conscious Electronic Polling System.
- [3] Evans M. and Furnell S., "Internet-Based Security Incidents and the Potential for False Alarms," *Electronic Networking Applications and Policy*.
- [4] Friedenber M., Heller B., McCracken W., and Schultz T., "E-voting System Requirements: An Analysis at the Legal, Ethical, Security, and Usability Levels.
- [5] Jefferson D., Rubin A., Simons B., and Wagner D., "Analyzing Internet Voting Security"
- [6] Jefferson D., Rubin A., Simons B., and Wagner D., "A Security Analysis of the Secure Electronic Registration and Voting Experiment (SERVE)".
- [7] Kohno T., Stubblefield A., Rubin A., and Wallach D., "Analysis of an Electronic Voting System, Security and Privacy".