

An Analysis of Secure Online Voting System

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Abstract –Considering the traditional voting environment voting process is quite inconvenient because of reluctance of voters to visit booth. Huge evolution in computer technology has invoked us to develop an online voting system which is much more easy, convenient and efficient. In this paper, a new approach of voting breaks the limitation of traditional voting and focuses on the security and feasibility of the voting, so that it may reach to all the voters from every class, which will be a major step towards making India a developed country from developing country. It is a twofold system consisting of SMS voting system and website voting system.

Keywords – Android, Biometric (Fingure print and voice), CAPTCHA, Encryption and Decryption, One Time password, Short Message Service (SMS), QR code, Web services.

I. INTRODUCTION

Voting is the main democratic right of every individual in India i.e. a voting must be usable by the entire voting but in traditional system urban population is not able to vote because of their busy schedule. Countries all over the world want an alternative for the traditional voting system. Electronic voting machines are more vulnerable to fraud activities like impression of voter and booth capturing. The reason why e-voting technology has not matured to higher level is because of lack of trust and fear of online threats. There should be certain confidentiality and authentication of votes casted by voters in the booths.

The basic idea behind this system is to overcome the limitations of the traditional voting system as there is complexity and huge time period required. Our aim is to implement a system which will encourage more voters to cast their votes remotely and hence increase in voting. This is a twofold system comprising of SMS voting system and website voting system. The proposed framework ensures much more security, transparency through biometric identification and authentication (fingure print impression and voice identification).

Our paper is organized as follows: Section II gives brief knowledge about the related work, Section III introduces the Existing System, Section IV explains our Proposed System with the basic building blocks that are used in our system. Section V is followed by advantages of our system over others, Future Scopes are listed in Section VI and finally, Section VII summarizes our paper.

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II. LITERATURE SURVEY

The voting system has experienced huge changes over years, traditional voting system which is also known as electronic voting system using 'EVM (Electronic Voting Machine)' requires huge investment of time because of which people neglect voting. Author of [1] has proposed an architecture in which voting is done by making use of cards, these cards are designed similar to smart cards which have entire details related to the voter embedded in them. Hence, the proposed architecture in [1] ensures assurance, security, verifiability and transparency in the voting system.

Implementation of e-voting on an Android System has been explained by Kirti Autade in [4], the proposed architecture in the paper cannot be used over large scale specially in a country like India which is one of the developing country and whose major percentage of voters come out from a rural background. But still the system is very much beneficial for small scale setup such as for College elections or Confidential recruitment.

As explained by Ankit Anand [7], in order to overcome the drawback of electronic voting system websites can be introduced which will help voters to remotely cast their votes. This system has capability of reducing human errors and will provide better scalability for large elections. But this system was not capable of reducing the conflicts due to fake identity and was even not feasible for rural people who do not have access to internet.

To overcome this Aree Ali Mohammed [3] proposed two way systems which came out as much enhanced and efficient alternative system. Twofold system comprises of SMS voting system and Website voting system. The undesirable characteristic of above mentioned system is lack of verifiability of voter identity, accuracy and transparency.

As per Gina Gallegos-Garcia [5] encryption, decryption and cryptography can be used as one of security measure while data transmission. Even Author [6] Jagdish B.chakole and P.R.Pardhi has proposed a design of secure online voting system by making use of asymmetric and symmetric keys for encryption and decryption of messages that are used for casting votes. It was designed to ensure accuracy, democracy simplicity, verifiability, consistency, privacy, security.

III. EXISTING SYSTEM

The existing systems today mostly use DRE voting system i.e. direct Recording Electronic. This system provides a smartcard for every voter to vote. The voter votes for the candidate of their choice using that smartcard respectively. The smartcard is nothing but the memory card which is used for computation when inserted in the smartcard reader. The advantages of using this smartcard is that it

reduces the chances of duplication in voting i.e. a single voter can cast only one vote with that smartcard. There is also a Voter Card ID which is provided to the voter but the primary validation number is the smartcard number. For providing confidentiality, non-traceability and security in the system some of the biometric details of the voters are registered earlier.

The prerequisite for any voter to vote is that the biometric identification should match with the earlier one registered. After the process of voting is completed the voter is given the final chance to review and confirm their vote. The time slot of 30 seconds is given to the voter to confirm their vote. If no action performed in those 30 seconds then the vote is confirmed. Then the smartcard number of the particular voter is registered to provide no multiplicity of votes. Then the system is ready for the next voter to vote.

IV. PROPOSED SYSTEM

The proposed system is a twofold system comprising of SMS voting system and website voting. The voter can use either of the two ways as per his convenience.

A. SMS voting system

In this system, voter can cast his vote by sending SMS to the system using any kind of hand set through the mobile

switching center. The voter has to first dial a toll-free number in which he has to answer through SMS depending upon the questions asked on recorded call. During the voting process the voter has to provide his voice sample on the call in order to prove his identity and avoid frauds. For this system an Android application is created on Android phone, entire information sent by voter through SMS is processed by Android application and then saved in the database.

B. Website voting system

The voter can even vote through the websites available on internet. Both Android application and the website are linked with same database on backend so that the voter can vote from either of the two ways as per his convenience and if he tries to vote again then the system will deny him to do so.

The proposed online voting system can be defined using four phases:

- 1) Registration phase.
- 2) Authentication phase.
- 3) Voting phase.
- 4) Counting phase.

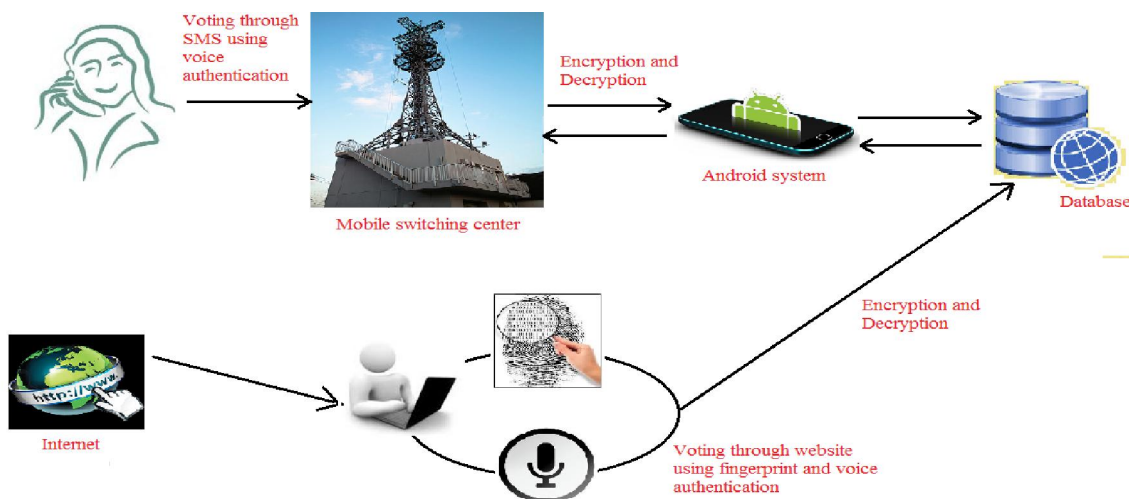


Fig 1: Voting system

A. Registration Phase:

In this phase participant has to register himself on to the website, participant can either be a Candidate, Voter or ECD (set of people who are conducting elections). Depending on the type of participant different access rights are allotted to the participant. During this phase unique User id and Password is allotted to participant for his unique identity, privacy and security of system.

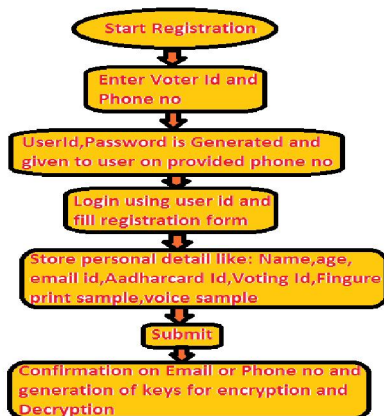


Fig 2: Registration process

B. Authentication Phase:

In this phase data introduced by user is authenticated with the data saved in database of server i.e identity of the participant is verified in order to provide him access to voting stage. The participant is provided access to next state if and only if his identity is authenticated successfully. Voter can enter into this phase either through mobile SMS way or through website.

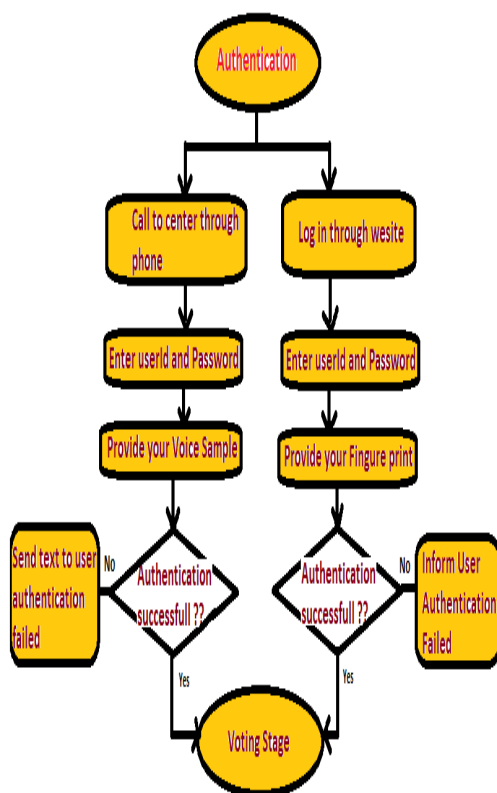


Fig 3: Authentication phase

C. Voting Phase

In this phase, voter casts his vote for the election and the Voting Authority encrypts the vote and sends it to the Counting Authority. This stage is accessed only after the Authentication stage has been validated by voter. Before forwarding the message to Counting authority blind factor is applied on the message so that while signing, identity of voter is not revealed to ECD and the document appears blank to ECD.

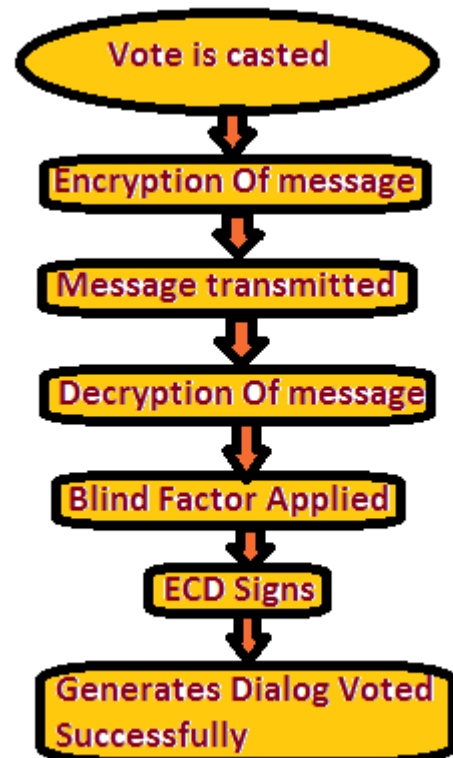


Fig 4: Voting process

D. Counting Phase

In this stage tally of all the valid votes that have been casted during the voting process is done. Then a count for each candidate is calculated separately to get a voting graph and declare the election result.

Security is a major issue in this online voting system, we are handling that by making use of RSA algorithm. It is an Encryption Decryption Algorithm in which a pair of keys (Asymmetric and symmetric key) is generated based on two large prime numbers. This algorithm is used while vote casting stage. Then we apply Blind signature on RSA algorithm in which a new pair of key is generated and used in voting and counting stage to hide the relationship between voter and vote from ECD. ECD can access the system only by using the specific QR Code provided to him. Hence, in this way we are providing security, privacy and accuracy to our system.

V. ADVANTAGES

1. **Unique identification of voter:** As our system is providing unique voter identification so that each voter can be uniquely identified and differentiated from other.
2. **Twofold system:** The main advantage is use of twofold system consisting of SMS voting system and website voting system.
3. **Village voting:** The SMS voting system with biometric security is mainly introduced for the rural people as there is very less contingency of internet in villages.
4. **Use of android system:** The use of android system to retrieve data and to store it in database coming through SMS voting.
5. **Precise vote counting:** There will be no repetition of voters so that our system can count the accurate numbers of votes.
6. **Increase in participation:** Online voting system is mainly helps to improve the participation of voters.

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VI. FUTURE SCOPE

The possible future scope of this project includes improvement in security level of the system. In annexation to that it would be interesting to meet some other confidential primitives to improve the security level of system.

The future improvement can also be done for system crash and power failure so that the voters can vote with more assurance.

VII. CONCLUSION

In this paper we have exerted method for encryption and decryption of messages to present a secured and feasible online voting system. The level of our system is importantly improved by the new essence of twofold system consisting of SMS voting system and website voting system. The user validation process of our system is enhanced by adding biometric (finger print and voice), security key and one time password. This system will exclude the customary action like rigging. Consequently, the member of state or country can believe that they alone can choose their leaders.

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