# NEXT GENERATION HI-TECH E-VOTING TECHNIQUES IN INDIA

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*Abstract*— **In India, Electronic voting machines are used for voting purpose. But in some foreign countries, E-Voting Systems have gained very much success by reducing the use of ballots and by using internet. The main reason why E-voting systems have gained such success in these countries is just because of convenience in this voting system as comparison to other traditional voting system [6].Here we discuss about social sites e-voting, News channel or News papers e-voting, Electronic voting, Electronic vote counting and Reality shows e-voting systems. These systems have gained much popularity. It reduces our time and cost also. We also discuss about some next generation hi-tech e-voting systems which can be used to improve traditional voting systems. The E-voting system using Biometric enables a voter to cast his vote using internet without going to a polling place**.

*Index Terms*— **OTP, Iris, EBM and e-voting.**

## I. INTRODUCTION

Voting system is the pillar of the every democracy. Especially in the democratic country like India polls are the biggest festival. To increase the participation of more and more people in the polls we require Hi-tech voting technique which will enhance and strengthen this democratic process. Currently in India, Electronic voting machines are used for voting purpose But E-voting systems have gained very much success and have been used for government elections in the United Kingdom, Estonia and Switzerland as well as municipal elections in Canada and party primary elections in the United States. It involves transmission of ballots and votes via private computer networks or the Internet. Electronic voting technology can speed the counting of ballots and can provide improved accessibility for disable voters.

The main reason why E-voting systems have gained such success in these countries is just because of convenience in this voting system as comparison to other traditional voting system. In this new era of Information technology, where we can do everything online like we can do online shopping, banking, billing etc. then why voters can't cast their vote online with the same security and convenience. One more thing which can be easily implemented by using electronic voting technology is known as instant-run off voting. Here voter can cast their vote by giving rank to the candidates as their first, second, third choice and so on, instead of choosing a single candidate. So if a situation arises in an election where no candidate receives a majority of first choice votes, the candidate with the least total of first choice votes is eliminated and the second choice votes from these ballots are added to the totals of the other candidates. Elimination of candidates is done in this manner until one winner has a majority of the total vote. The one most important benefit of using the E-voting is that it will increase the overall turn out of the voting because the voter can vote from any place either he is in state or out of state. Especially with the help of E-voting the rate of younger voters who are more comfortable with technology.

### WHAT IS E- VOTING?

The voting through internet is known as E-voting. In this voting system election data is recorded, stored and processed in the form of digital information. Everything is automated in this technique either it is registration process, vote casting, vote counting or ballot generation. E-voting involves the act of voting using the electronic system to cast and count votes. That's why it is also known as internet voting. It is a tool for making the electoral process more efficient. The E-voting make the voting easier and also speeds up the processing of result.

### WHY WE NEED E- VOTING SYSTEM?

The benefits of developing the E-voting system are:

It allows the voter to vote from anywhere either he is in state or out of state. With the help of E-voting, the overall turn out of the voting increases. The cost of printing, Man power is also decreased with the help of E-voting. The fast counting of votes with the help of E-voting will provide result in 2-3 hours in place of 30-40 hours. It will result in saving on paper ballot printing. Transportation and storage cost also decreases with the help of E-voting. It provides much Convenience of voting from any place.



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## II. TRADITIONAL VOTING PROCESS

Traditional voting process can be divided into different phases.

1. **Authentication:** In this phase, voter authenticates himself or herself by showing his or her voting card, this step is public and verified by the presiding officer. At the end of authentication process, presiding officer give a ballot paper to voter to cast his or her vote.

**2. Vote:** The vote takes place in a protected booth where voter cannot be seen by any person. The voter cast their vote by writing it with a pen on the paper ballot, folds the ballot paper and put into the ballot box where all the votes are mixed.

**3. Vote counting**: At the end of voting time, the presiding officer collect the ballot box containing all ballot papers and submit it to the counting centre. After that with the help of members of the election committee nominated by election commission of India, the ballot boxes are opened and votes are counted and the results are then announced.

**4. Verification:** Various types of verification process are used; most procedures are public and verified by the representative of candidates of competing parties. Recount is also possible if there is any fraud or error.

## III. EXISTING VOTING SYSTEMS IN INDIA

Paper-based voting system is a system where votes are cast and counted by hand using paper ballots. With the invention of electronic tabulation, The electronic procedure of counting the votes starts in place of paper ballots. These systems included punched card voting, mark sense and digital pen voting systems .

Most recently, these systems can include an Electronic Ballot Marker (EBM) that allows voters to make their selections using an electronic input device, and a touch screen system similar to a DRE.

Electronic voting technology can speed the counting of ballots, reduce the cost of paying staff to count votes manually and can provide improved accessibility for disabled voters.

**1. ELECTRONIC VOTING:** Electronic voting refers to any system where a voter casts his or her ballot using an electronic system, rather than a paper. Once recorded, an electronic vote is stored digitally and transferred from each electronic voting machine to a counting system.

**2. ELECTRONIC VOTE COUNTING:** Electronic vote counting refers to the system that is used to tabulate ballots and award seats. It would be possible to vote using a non-electronic medium and then convert these votes to an electronic system and award seats through an electronic vote counting system .

Electronic Voting Machine is a simple electronic device used to record votes in place of ballot papers and boxes which were used earlier in conventional voting system. It is a simple machine that can be operated easily by both the polling personnel and the voters. Being a standalone machine without any network connectivity, nobody can interfere with its programming and manipulate the result.

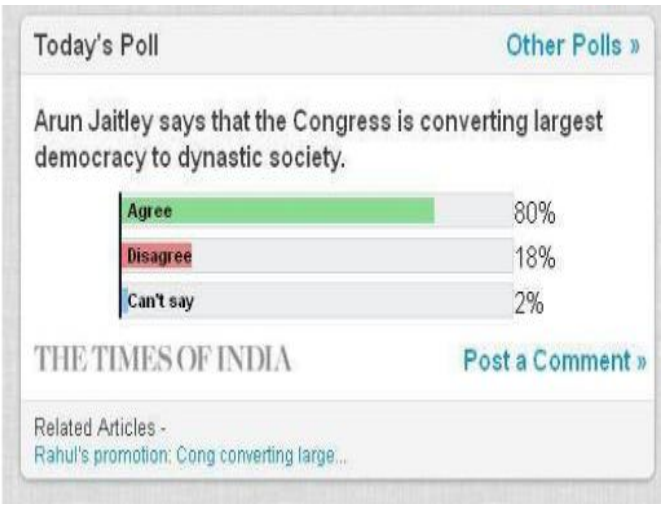
Figure: Electronic voting machine

## 3. VOTING THROUGH SMS:

This system finds very much scope in the Reality Shows. As this system can be modified according to the needs of the particular show, the system can be made functional to a specific event. In this type of voting system the voters cast their vote through sms. For casting vote voter has to send a message in specific predefined format with candidate name to given phone number. The candidate with highest supporting messages is declared as a winner. Usually in reality shows this type of voting system is used.

## 4. DAILY NEWS POLLS

The system can be used for the daily online news polls carried out by the number of national news papers and news channels e.g Times of India, Hindustan Times, Star News, Zee News etc. Security is not main requirement of this system as it is done for analysis purpose only. This voting is done on social or other important topics. Anyone can caste his or her vote in this system irrespective of age.



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#### 5. SOCIAL NETWORKING SITES POLLING:

The system can be used on the social network to conduct polling on general and social topics.
For the sites like facebook, twitter, this system can be used for getting public suggestions and views on the social or any recent issues.

## IV. NEXT GENERATION E-VOTING TECHNIQUES IN INDIA

In India, E-voting techniques like one time password techniques, face recognition and fingerprint recognition techniques does not exists now but in next generation, By having these techniques for E-voting purpose, we can save our time and cost also. The E-voting system using Biometric enables a voter to cast his vote using internet without going to a polling place.

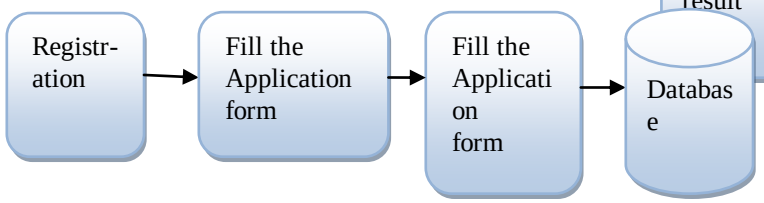
#### 1. ONE TIME PASSWORD TECHNIQUE:-

OTP means one time password which is used for login authentication of the voter. In E-voting system, only a valid user can cast the vote. In OTP system, firstly voter registers on the site by giving the personal details like user name, date of birth, address, gender, and unique Aadhaar card number and mobile number for physical verification. Aadhaar number is a main security concept in E-voting as every citizen in India having Unique Aadhaar number issued by Indian Government. That's the reason why Aadhaar number is used as a user ID for casting the vote online. In place of static password, the proposed system uses one time password. when we use static password, normally it stores in computer hard drive or in server so there is a change for stolen of a password. But in case of OTP, Every time user login into voting website, a new 6 digits one time password is generated by server and send it to voter mobile. So it provided more security than that of static password.

**Step by step explanation of one time password technique in E-voting:-**

**Registration of a voter:-**

In this proposed system, user firstly has to register in the voting website by filling an Application form which includes personal detail of a voter like username, D.O.B, gender, Address, Aadhaar card number and mobile number. Field officer first verifies the voter details and submits a report to admin on server side. If voter details are correct then admin grants the permission for e-voting. Otherwise voter registration will be marked as cancel and he/she is not able to cast the vote.




**Login and Authentication:-**

The process of voter login is shown in the figure. The step by step operation of voter verification between voter and server is:-
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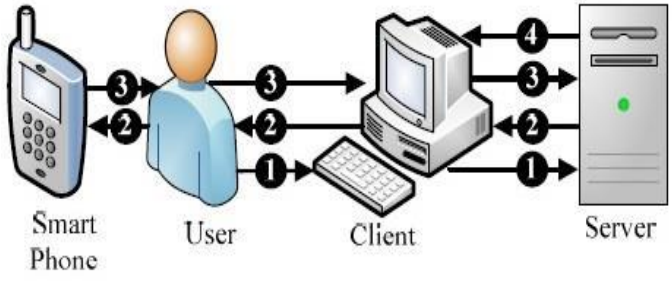


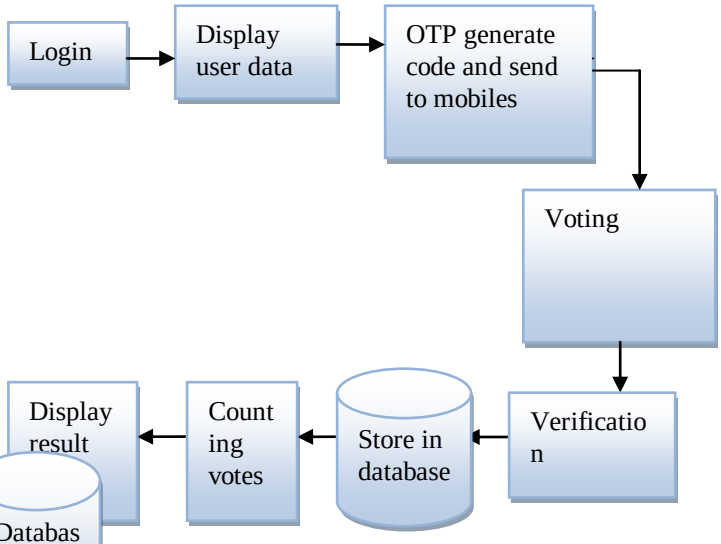

**Figure: One Time Password Generation between Voter and Server**

I. Voter login into the voting web site with voter- id as Aadhaar number as he/she registered. As a response of call, a protected session will be established i.e., allow a voter to enter voter ID. After that server fetch the data from the database related to voter ID.

II. Every time voter login into voting website, Server sends a new password or OTP Code to the voter mobile phone. One Time Password is a Random 6 Digit Number that changes every time, whenever user logs on to the system.

III. Voter response with the same OTP code and server compare with the generated OTP code and provide a secure login session.

IV. Server will check prior steps and handover the request to authentication and authorization server. After verification, server store the vote cast by voter in database.
After casting vote the voter is allowed to check the result by visiting the result page.



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**2. FACE DETECTION E-VOTING**

During this technique firstly a person has to register himself/herself in the voter-list. For this different facial expressions and poses of faces of persons are detected and stored in a database system. Then we estimate the ratios of different face parts and match it with the ratio of the face image we have stored in the database system. If it matches the person, then he will be allowed to cast the vote. If the image is not recognized the person is not eligible to cast its vote.

Figure: Different Expressions of one person

In this technique, database of different poses of of all persons is stored in one main secured computer. To cast a vote, User has to fill a registration form. All the entries will be checked through main secured computer. If the entries are correct then a unique user id and password will be given to person. By using that user id and password, user can cast his or her vote.

**3. FINGERPRINT RECOGNITION BASED E-VOTING**

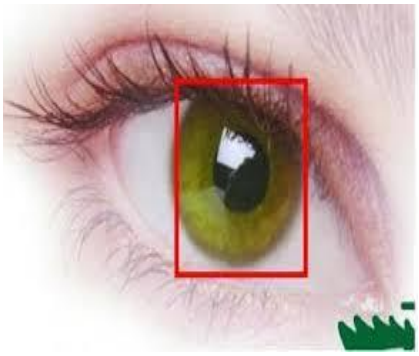
Fingerprint based identification is one of the oldest method and the most highly used method for human recognisation in various fields such as attendance, access control systems because of their uniqueness and reliability. This system can be used for voting purpose in India. For the security purpose, we can use this kind of technology.

In main server of Government, Database of fingerprints of identified persons will be stored. During voting, firstly voter has to fill his identification number, after pressing enter button, voter has to give his fingerprints in the scanner, and System will check whether it matches with the already stored fingerprints in computer database. If it matches, the system will allow the voter to cast his or her vote. Otherwise, He or she will not be allowed to cast his or her vote.

**4. RETINA RECOGNITION**

People's eyes also remained unchanged after eye surgery and blind people can use also use iris scanners as long as their eyes have irises. Eyeglasses and contact lenses also do not interfere or cause inaccurate readings .

In this technique, user has to look directly into retina scanning machine and the machines scans the retina after that voter is made to vote. Then the data including the retina pattern is sent to interfacing device which converts it into radio waves. These radio waves are then sent to mobile tower. The authentication and voter identification is stored into a secured database at the remote server.



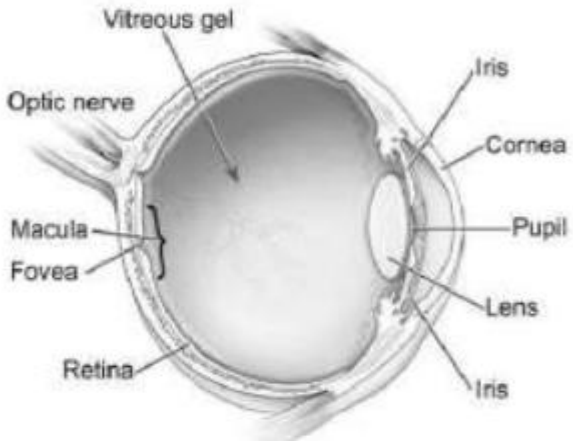



**Figure: Front-on-view of human eye**



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**Figure: Retina recognition**

This biometrics system does not use laser-scan to capture the image of the human eye. Instead, an infrared photo or video camera is used at a set distance to capture a high quality image of the retina. The beam of light traces a standardized path on the retina. Because retinal blood vessels are more absorbent of this than the rest of the eye, the amount of reflection varies during the scan. The pattern of variations is converted to computer code and stored in the database.

## V. ADVANTAGES OF NEXT GENERATION E-VOTING TECHNIQUES:

For large country like India with the help of electronic voting and electronic counting people can get official election results within hours, instead of weeks. Electronic voting helps to reduce the human error because it allows a process that is so automated, transparent and secure. It is also a good technique for a disable person to cast his/her vote independently. So with the help of E-voting every person who is eligible for vote can cast vote and it will result in increases the overall voter turnout. Online voting uses the concept of Saved ballot templates. Saved Ballot Templates means that once your election is set up, you may save the configuration for reuse in future elections. This simplifies the setup process and means the only thing that needs to be done for future ballot setup is to provide the names of the candidates and the election dates. Overall cost is also reduces with the help of E-voting due to no need of printing, mailing or even eliminated entirely from the election process. E-voting provides Archived election results. Archived election Results means all previous election results is available at your account to find results from previous elections. It provides ability to correct mistakes, allow voters to go back and correct any mistakes before final submission of their ballot. Email reminders concept used in E-voting to send reminders to voters who have not voted and provide them with a link straight to the online ballot. Email validation is used to inspects voters 'email addresses and notifies us of any that are not properly formatted.. Automated tallying removes human contribution and makes your election results available within seconds of the close of the election.

## VI. SECURITY REQUIREMENTS IN NEXT GENERATION E-VOTING TECHNIQUES:

The one main requirement in E-voting system is authentication and identification of the person so that only eligible candidates can vote. Also protection from unauthorized intervention from third parties i.e. hacker attacks should be prevented. Secondly the vote of the person should be private. The Confidentiality, integrity and availability of the data should be maintained. Reversible vote system should also be maintained. Reversible vote refers to a system where the voter can vote as many times as he/she wishes but only the last vote will be counted. The computer system used for E-voting should be protected from accidental and malicious denial of services.

Security requirements/solutions traditional vs. electronic voting:-

| REQUIREMENTS | TRADITIONAL | ELECTRONIC |
|---|---|---|
| AUTHENTICATION | SIGNATURE ; PHOTO-ID | ELECTRONIC SIGNATURE; PASSWORD |
| CONFIDENTIALITY | LOCKS; ENVELOPES | ENCRYPTION TECHNIQUE |
| DATA INTEGRITY | PAPER FORMS | HASH FUNCTIONS |

## VII. CONCLUSION

These New techniques are authentication techniques. As Day by day the population is increasing which in turns demands the improvement in the voting system. So with the help of these new techniques, we can make the voting system attractive as well as It will increase the rate of voting percentage. The above discussed old voting techniques are exceptionally good, but there is always scope for further improvement. Although there are also some weakness of this next generation Hi-tech techniques, but its advantages will nullify these issues. Security is the key success factor for e-voting. In India, Face recognition, one time password techniques and fingerprint recognition techniques does not exists now but in next generation, By having these techniques for e-voting purpose, we can save our time and cost also. Thus we conclude that an e-voting system that can serve as a revision tool in real time that will facilitate the voters to vote efficiently and effortlessly.

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