

# ADVANCED TECHNOLOGY IN SECURED ONLINE VOTING SYSTEM

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**Abstract** - In the new era of advanced technology where online system boosts work speed, reduces mistakes and promotes the generation of accurate results, having manual election system becomes a misfortune. A public election system constitutes the backbone of a democracy where the people have to elect their state's leader. India currently uses a manual election system, which causes several kinds of problems. Due to this paper ballot based election system, some problems are faced by voters before or during elections and others are faced by the administration before and after the voting. An online system, which involves procedures like registration of voters, vote casting, vote counting, and declaring results would constitute a good solution to replace current system and the proposed system in this thesis will be helpful for the voters by using any resources like their own system or arranged by Government. Moreover, the proposed system will also decrease the risk for corruption. The system is proposed after interviewing officials of two departments, the Nation Database and Registration Authority India (NADRA) and the Election Commission of India (ECP). NADRA has an online database of the citizens of India, and is providing the Computerized National Identity Cards (CNIC) and also supporting different organizations with their online system. So, by using NADRA's system it becomes easy to register all voters of the age 18 or above, and furthermore to verify and secure their data.

**Keywords:** an efficient online voting system, a securable online voting system, a most preference of online voting system.

## 1. INTRODUCTION

### 1.1 GENERAL

Democracy is an important matter in most modern societies. One of the most important activities within a democracy is the election of representatives. It is also a very delicate process that is the subject of various disturbances, such as inactive citizens, attempts of fraud etc. In this thesis, I will discuss some of these problems, starting from the current democratic situation in India. I will also propose a software solution to the problem in terms of a prototype that will display the most important aspects of this problem.

### 1.2 NEED FOR THE STUDY

In a democracy, the electorate expresses its will through the election of representatives. These elected

representatives operate the country, on behalf of the political body. In order for the representatives to appropriately represent and implement the demands of the people, the elections in which they are elected must be held fairly and results computed accurately.

Observing the history we deduce that Polling Systems based on hand rising had just a problem with security (elections were not anonymous). Instead a Paper-based Polling System has at least three problems (discussed below). The paradigm shift from hand-based polling system to paper-based polling system is caused due to population growth whereas, now, time and safety are so important that it has driven a new paradigm shift from paper to electronic. There is no defensible reason to stick with paper polling system, but there are many security reasons to encourage the use of a new electronic polling system in order to draw up polling systems to digital era.

In India's current paper polling system, there are some other troubles as well apart from low turnout of votes, by looking at those problems, it is necessary to build a system which could solve those problems and speed up the election system.

1. **Speed:** Hand counting votes is time consuming especially in most populated countries like India, where many candidates are for same position and voter has to cast vote for many races.
2. **Intelligibility:** When a system based on pens, stamps, punch cards or ballot papers is used for voting in a paper-based polling system, the result can be ambiguous.
3. **Accessibility:** Disabled or duty-bound people do not have an easy access to the poll booth, but an easily touchable system will help them to cast their vote.
4. **Transparency:** Chances of manipulation of the results from influencing authorities will almost be finished.

### 1.2 OBJECTIVES OF THE STUDY

The aim of the study is to analyze the current election system and suggest an online election system which will allow people to cast votes in a more convenient way, by using available resources which could facilitate the voters during elections.

## 2. REVIEW OF LITERATURE

### 2.1 INTRODUCTION

To offer an online election system, it was necessary to study the current computerized voting system or voting machines working in different countries. Many developed countries USA, Australia have already adopted an online Election system.<sup>[1][12]</sup>

### 2.2 ELECTRONIC VOTING

Technology can include punched cards, optical scan voting systems and specialized voting kiosks (including self-contained direct-recording electronic voting systems, or DRE). It can also involve transmission of ballots and votes via telephones, private computer networks, or via the Internet.

Electronic voting helps voters to cast votes in an election through computerized equipment.

Sometimes this term is used to take votes over Internet.

#### 2.2.1 MACHINE COUNTING

Machine-readable ballot systems provides help to the voters to mark their votes on a paper card with marker and remove divots from a perforated card with a stylus or mechanical hole puncher.<sup>[1]</sup>

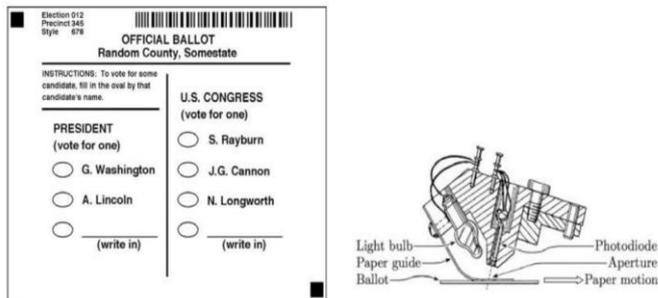


Figure 2.1: Machine readable ballot paper and counting machine

#### 2.2.2 COMPUTER VOTING

Electronic voting machines (DRE) looking like an ATM's or personal computer used to cast votes, which provides help to vote through a keyboard, a touch screen, or a pointer to mark their votes.<sup>[2]</sup>



Figure 2.2: Touch screen & other electronic voting machine

#### 2.2.3 ONLINE VOTING

Online voting may be conducted in a variety of ways:

1. **Poll site internet voting systems** that require voters to go to staffed polling places and use computers to cast their votes. The internet is used to transfer the ballots from each polling place to centralized tallying centers.
2. **Regional poll site internet voting systems** that allow voters to go to any poll site in a particular city or region to cast their vote. The system keeps track of which voters have already cast their ballots, and delivers the correct ballot paper to each voter based on where one resides.
3. **KIOSK internet voting systems** that allow voters to vote from computers in KIOSKs set up by the voting authority in convenient locations such as post offices and shopping malls. The KIOSKs are not monitored by poll workers all the time and may allow voting over a period of several days or weeks.
4. **Remote systems that allow voters** to vote from any computer connected to the internet - typically at home or at work. As well as via PCs, home internet voting could be through digital TV or even mobile phones or games machines. Remote internet voting might be used to replace poll site voting entirely, or it might be used only for absentee balloting.<sup>[2]</sup>

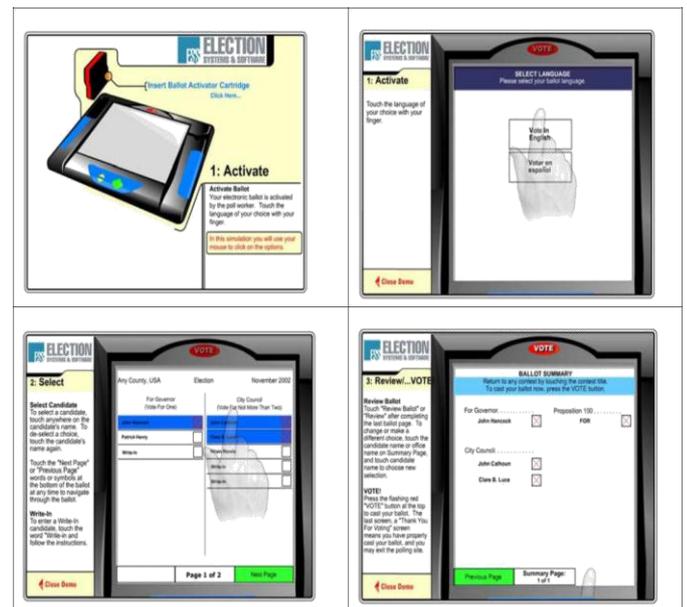


Figure 2.3: Steps to cast a vote in voting machine

The dramatic impact of the internet has led to discussions about the relation between e-democracy and online voting. Some early enthusiasts declared that the internet could replace representative democracy, enabling everyone to vote on everything and anything at the push of a button<sup>[6]</sup>. Such visions oversimplify the democratic process. Others have argued that e-voting could reduce costs and increase turnout by making voting more convenient<sup>[8]</sup>.

### 3. SYSTEM ANALYSIS

#### 3.1 EXISTING SYSTEM

In the present system there are no such application level system provisions in the country to carry out the voting and procedure as a whole. Also in the present status, there is no such application in use for automated system for voting according to the voting structure existing in the country. All the step by step procedures are carried out by the authorized authorities according to the jobs assigned by the ECI. The fact is all the procedures are carried out manually, starting from the registration process to result publishing.

The government to do this process manually wastes a lot of time and money. Thus the present system proves itself to be an inefficient one. The existing system is not web based. The user or person must want to go to the polling station for casting their votes.

##### 3.1.1 DRAWBACKS IN EXISTING SYSTEM

The problems of the existing manual system of voting include among others the following:

**Expensive and Time consuming:** The process of collecting data and entering this data into the database takes too much time and is expensive to conduct, for example, time and money is spent in printing data capture forms, in preparing registration stations together with human resources, and there after advertising the days set for registration process including sensitizing voters on the need for registration, as well as time spent on entering this data to the database.

1. **Too much paper work:** The process involves too much paper work and paper storage which is difficult as papers become bulky with the population size.
2. **Errors during data entry:** Errors are part of all human beings; it is very unlikely for humans to be 100 percent efficient in data entry.
3. **Loss of registration forms:** Some times, registration forms get lost after being filled in with voters' details, in most cases these are difficult to follow-up and therefore many remain unregistered even though they are voting age nationals and interested in exercising their right to vote.

**Short time provided to view the voter register:** This is a very big problem since not all people have free time during the given short period of time to check and update the voter register. Above all, a number of voters end up being locked out from voting.

#### 3.2 PROPOSED SYSTEM

The new implemented voting protocol has two main players: The voter and administrator sections. The voter(which can be found at home, in a working station, in a

special polling station or any other device have the function of performing the Authentication and voting).The administrator performs the function of voter and candidate registration, authorization and validation of voter, database and counting and the result.

The main advantages of the new protocol are the following:

Public transparency by the administrator (publication of Voter ID key, etc.).

Inured to technical troubles like interruption of access, etc, uncomplicated recovery.

Possibility of configuration for different voting models by policies and Greater performance.

Furthermore it is assumed that a trust worthy administrator is available. Apart from that, the accessibility to the public in the voting procedure plays a special role, which means that the voting result can be monitored, although casting of the votes has to be secret as a matter of course.

Accessibility to the public is necessary for all voting stages and is performed by the electoral committee, but also by any member of the public.



##### 3.2.1 ADVANTAGES

1. **ELECTION COMMISSION OF INDIA** can change the information any time if required. Registration of the Voter depends upon the information filled by the user and Voter is given a unique ID and PASSWORD.

2. In the DATABASE information of every voter is stored and Database shows the information of every user.

### 4. SYSTEM MODULES

#### 4.1 MODULE DESIGN

The proposed system consists of two modules,

1. User Module
2. Administrator Module

#### 4.1.1 USER MODULE

User interface consists of a login name and unique password using which he/she can login into the online voting system. This will be supplied by the administrator to the user. Once the user has logged in, he has the privilege to view the names of the candidates listed by the administrator, view the results after the termination date of the election. The user module constitutes only one sub module:

##### CANDIDATE REGISTRATION

This facilitates of voter view the register form are enter the details and finally submit the details within check the details in administrator so your particular details are true accept the registration. Otherwise cross check the details, this details are false immediately reject your registration.

##### LOGIN

Each voter is provided with unique username and password manually by the administrator. The voter uses the username and password for login and exercise the fundamental right of voting.

If incorrect username and password entered, the access to is denied to the user. And also voter is allowed to vote only once. This is the security feature provided against external access of the system.

After login the voter enters the voter home page, which provides the links.

##### VOTING SYSTEM

This provides the voter with a list of candidate with in his/her constituency along with selection option (radio button) to select the preferred candidate from the list. If the voting date is before termination date, the vote goes valid else goes invalid.

##### VIEW RESULTS

This provides graphical and user friendly representation of the votes obtained by each candidate. It includes the percentage of the votes obtained by each candidate. But the result can be viewed only after the termination date of the election.

##### LOGOUT

This provides an option for the voter to quit the session, while in the voter home page.

#### 4.1.2 ADMINISTRATOR MODULE

Administrator interface consists of a login name and unique password using which admin can login into the online voting system. Administrator has the main control of the system. By logging into the page it can perform the following tasks.

##### ADD CONSTITUENCY

Here the election to be conducted is selected. To add an election the constituency should be selected and termination date of election should be specified.

##### VOTERS LIST

Here we can view the voters list. Each constituency will be having separate voters list.

##### CANDIDATE LIST

The list of candidates participating in the election can be seen. It includes the candidates name, party name and party symbol.

The sub-modules of administrator are:

1. Voting Structure
2. Voters Registration
3. Candidate Registration
4. Counting & Categorization of Results

##### VOTING STRUCTURE

Here the eligible voters who are permitted to login to the system can utilize the right to vote. Each voter can register a single vote to a candidate's favour in his/her constituency. The security measures taken within the system prevents them from exercising their votes again i.e. the second vote by the same user goes invalid. The starting and ending dates of the election are specified by the administrator. The user must have an identity card and he must be in voters list.

##### VOTERS REGISTRATION

The registration procedure of all the eligible voters. This registration process is done by the administrator. According to voters database each voter is provided with a unique identification codes which includes username and password.

The details of the voters include username, password, name, address, gender, constituency, image etc. With the voter registration, thus producing the voter list with the given information of the voters. The voter list can be viewed by anyone accessing the webpage. The admin can view the voter list with in his homepage.

##### CANDIDATE REGISTRATION

The registration of the candidates in each constituency is done by the administrator. The details of the candidate includes name, address, gender, his/her constituency, party and image. With the candidate registration, thus producing the candidate list with the given information of the candidates. The candidate list can be

viewed by admin and the vote within their respective homepages.

According to candidates database (manual) each details of the candidates are stored in database controlled by the admin including candidates details.

### COUNTING & CATEGORIZATION OF RESULTS

When the voter votes, the number of votes obtained by the selected candidate is incremented by 1. The result is published only after the voting process is over. It is accessible from the next day after the termination date. Here we depict the result in the graphical representation according to the percentage of vote obtained by the candidate. Result can be viewed by everyone who visits into the site without any authentication problem. A link to view the result is kept in the index page and both admin and voter can view the result in their respective homepages. When the user clicks the result link, before the termination date of the election, "Result not Published yet" Message will be displayed. The result comes with their party symbol on the top of the graph representing the percentage of vote obtained by each candidate.

### 4.3 DATA FLOW DIAGRAMS

#### LEVEL 0:

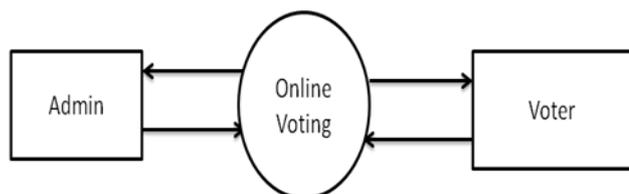
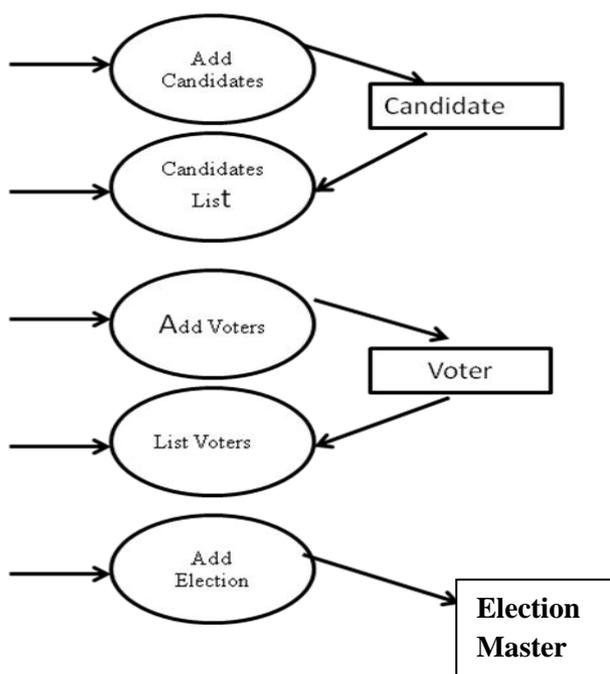


Figure 4.3.1: Level 0 DFD

#### LEVEL 1:



### 5. CONCLUSION

By doing this project we were able to bring a new system for online national voting for our country. With the advent of technology and Internet in our day to day life, we were able to offer advanced voting system to voters both in the country and outside through our online voting system.

#### Top 4 Reasons to Move to the Online Voting Platform

**1. Efficient and Cost Effective:** The system offers significant cost benefits over paper elections in a vote to vote comparison. It saves an organization the cost of creating, printing and postage, since everything can be handled electronically. Online elections reduce the use of paper and the amount of work for both the organization, as well as voters.

**2. Intelligent:** The Online Voting Platform offers intelligent ballots, smart checklist features, vote tallying, tabulation and reporting. These functions are automatic and do not need to be assigned to personnel in-house. Additionally, it allows administrators to create rules on ballots so that voters cannot cast invalid votes, nor do they need to be checked while counting.

**3. Easy and convenient:** The Online Voting Platform offers the easiest and most convenient method for administrators and voters alike. For administrators, the process of setting up a ballot and conducting an election is simple and manageable.

The other advantages that the system offers are:

1. Efficient data storage and Intelligent Management.
2. Accuracy, real-time response and user friendliness.

### FUTURE ENHANCEMENTS

In future we can add an SMS query also, we will get the result updates at the time of counting. To receive the SMS we need to register with our mobile number in the site.

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## BIOGRAPHIES



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