



**TECH SAKSHAM
FINAL PROJECT REPORT
CAPSTONE PROJECT
“ ONLINE VOTING SYSTEM ”**

“ AVANTHI SCIENTIFIC TECHNOLOGICAL & RESEARCH ACADEMY ”

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ABSTRACT

Unlike traditional systems, electronic voting (e-voting) systems exploit computerized voting equipment, computer networks and cryptographic protocols to conduct elections. They possess the ability to merge both verifiability and ballot secrecy successfully at the same time, a combination that cannot be achieved by other means. Hence, elections conducted by e-voting systems are expected to be efficient, accurate, secure and convenient. However, potential problems associated with e-voting systems may degrade their acceptance. To establish e-voting systems as a reliable tool to conduct elections, extensive research has been proposed. This paper proposes an analysis of existing e-voting schemes along with their scopes and limitations. The project is mainly aimed at providing a secured and user friendly Online Voting System. The problem of voting is still critical in terms of safety and security. This system deals with the design and development of a web based voting system using fingerprint and aadhaar card in order to provide a high performance with high security to the voting system. The proposed Online Voting System allows the voters to scan their fingerprint, which is then matched with an already saved image within a database that is retrieved from aadhaar card database of the government. The voting system is managed in a simpler way as all the users must login by aadhaar card number and click on his/her favorable candidates to cast the vote. By using biometric fingerprints it provides enough security which reduces the dummy votes.

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CHAPTER 1

INTRODUCTION

1.1 Overview

The online voting system is the system implemented to make the voting system easy for both polling and also for the administrator to view and check the result for each area individually. Here the voting is done anywhere within the area in which they reside.

The voters or the administrator can login only if they already have a user id and password. New user can be only created by the administrator.

The voter can login with his user id only if he has not casted the vote already. If he has already casted the vote the voter status is changed to voted and he cannot login with that user id unless the administrator refreshes the voting system. The administrator controls all parts of the online voting system except the vote casting part which is restricted to the voters only. The administrator is the only one who can create new voters.

The administrator is the soul controller of the online voting system. He can create new nominees for the election and he can view the individual election status for each locality. The graphs are enabled to show the election status easily

When the voter logs in he can view his personal details which cannot be edited by him; he can only report the changes to the administrator who can edit the details. The voter is granted permission only to view his personal details and vote.

The voter while voting is provided with two options, one he can vote to any one of the nominees in the ballot page and another he can register his vote as not willing to vote to avoid the illegal voting. The flow of the administrator and the voter completely differs based on the authentication type which they choose.

1.2 Feature

Nominations Services

Your chosen online voting provider should offer nominations services, which streamlines the process of selecting candidates before the election. Members can easily nominate someone

through online petitions or simple forms that only require an email address. The service should include application assistance, the ability to upload pertinent information, and opportunities for review. Better yet, some software can alert nominees if they're missing information or don't meet eligibility criteria. The review process should allow the deciding bodies to add notes and check the status of every application in real time.

Ballot Features

Among the most critical items in an election is an easy-to-understand ballot. A reputable voting management agency should offer customizable online ballots that meet your organization's needs. These ballots should include the number of open positions, candidate biographies and pictures, and an option for write-in candidates. Depending on what's being decided in an election, ballots may include space for specific issues or amendments, the choice to abstain, options for a quorum or proxy, and the attachment of additional documents. It can also include your organization's logo and brand colors.

Full-Service Management

It's crucial your online voting service provides a seamless election experience, so members of your organization shouldn't have to lift a finger, except to participate in the vote. The company you partner with should set up and manage the election from the nominations stage to the final tabulation and analysis process. The service should also provide 24/7 technical support to the organization and individual voters should they have trouble accessing the ballots. You should also ensure voters have the ability to access their ballots at any time, anywhere on the day of the election.

Social Media Integration

A secure election vendor will offer this integration once the voting process is complete. Once a member completes their ballot, they'll be directed to a page containing a "Thank You" message and social media icons for LinkedIn, Facebook, or Twitter. If they click on these buttons, they can share that they've successfully cast their ballot and encourage fellow members to do the same. This contemporary tool can increase voter turnout.

Tracking & Tabulation

A comprehensive election vendor will ensure organizations have access to tracking and tabulation features so they can view results in real time. For online elections, certain types of software can track opens, click rates, and the exact moment a vote is processed. You can review the votes as they come in, but won't be able to see who cast the ballot. Once the digital election has come to a close, the agency will provide a tabulation of results with additional analyses upon request.

Security

Along with the ballots, security should always be a top priority. This means you should engage a service provider that offers a wide range of protection options. Each member should only be allowed to vote once through the software and ballots should remain secret. The management system should be able to count the votes, ensure the ballots aren't associated with any members, and guarantee your organization's information will not be shared with third parties.

1.3 Advantages

The advantages of online voting systems include increased efficiency, improved accuracy, and greater voter engagement compared to paper ballots.

Increased Efficiency

One of the most significant advantages of online voting systems is incredible efficiency. With traditional paper-based voting, there are a lot of steps involved, from printing ballots to counting votes by hand. You can avoid all of that with online voting.

With an online system, you can send out electronic ballots to all of your voters in just a few clicks. And once the voting period is over, the system will automatically tally the results, so you don't have to do it yourself, saving your organization a lot of time and money.

Improved Accuracy

Another advantage of online voting systems is that they tend to be more accurate than traditional paper-based systems. On the other hand, there's always the potential for human error with paper ballots, whether it's miscounting votes or mixing up ballots.

But with an online voting system, the votes are tallied automatically, so there's no chance for human error, giving you peace of mind knowing that your results are accurate.

Greater Turnout And Voter Engagement

Another advantage of online voting is that it can increase voter turnout because it's more convenient for voters to cast their ballots online than to have to go to a physical polling place. In addition, online elections can also improve voter engagement. It can be easy for voters to feel disconnected from the process of traditional voting. But with online voting, they can see the results in real-time, making them feel more engaged in the process.

1.4 Scope

- Increasing number of voters as individuals will find it easier and more convenient to vote.
- Less effort and less labor intensive, as the primary cost and focus primary on creating, managing, and running a secure web voting portal.
- The system can be used anytime and from anywhere by the Voters.
- No one can cast votes on behalf of others and multiple times. v. Saves time and reduces human intervention.
- The system is flexible and secured to be used.
- Unique Identification of voter through Aadhar number.
- Improves voting with a friendly Interface. ix. No fraud vote can be submitted

1.5 Future Work

The challenge of developing electronic voting systems is not only security but also protecting the secrecy of the ballot, a bedrock principle of free and fair elections. Currently there is “no known technology that can guarantee the secrecy, security, and verifiability of a marked ballot transmitted over the Internet.

Online voting presents numerous vulnerabilities and is fundamentally insecure. There is potential for unobserved vote manipulation as well additional security vulnerabilities including potential denial of service attacks, malware intrusions, and privacy concerns. Online voting does not produce a paper trail for auditing.

Blockchain-based voting, which relies on a decentralized, distributed digital ledger is vulnerable to many of the security flaws inherent in internet voting, such as the potential for malware to alter votes on a voter’s local device before the ballot is transmitted and the lack of secret ballots. Online and blockchain-based voting would greatly increase the risk of undetectable, nation-scale election failures.²

Multiple ongoing DARPA projects aim to develop secure hardware focused on developing hardware resistant to software- based attack through novel CPU designs. ^{3, 4} Future systems based on secure hardware could provide additional security, but the technology is still in early development.

End-to-end verifiable election software relies on cryptography to encrypt and protect votes while allowing voters to see their vote was properly recorded, that the vote was correctly tabulated, and that the final vote count matches the cast votes. End-to-end verifiable software can be integrated into existing election systems to enhance the security of voting infrastructure.⁵ Recent open-source software packages including end-to-end verifiability systems, such as Microsoft’s software development kit ElectionGuard, could increase security if implemented in future elections.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

Online voting can generally be conducted in two ways — remote online voting and on-site online voting. Your internet voting depends on the options stipulated by your bylaws. Your bylaws are always the first place to check when deciding if you need to run an on-site or remote online vote. In some cases, you may even be allowed to utilize both options!

Remote Online Voting and Polls

Remote online voting is online voting performed remotely. This type of voting is a form of an absentee ballot and is becoming extremely popular, as it goes one step further than on-site voting does to increase convenience for the voters. Instead of having to go out and vote in-person, remote online voting allows a voter to cast their vote at any time, from anywhere. All a voter needs to vote is a notice containing their voting credentials, a device that can connect to the internet, and an internet connection!

Traditionally, the challenge with remote voting was inherently tied to the distribution method that had to be used: postal services. Since paper was the basis for the voting process, paper ballots had to be mailed to voters and then had to be mailed back for counting the results of the election. The issues with postal services are that postage is expensive, it takes time for ballots to be mailed out and mailed back, and information can be lost in the mail.

However, when using an online voting process for your remote election, none of the above issues are a risk! This is because:

- Emails don't have a postage charge, so you save on postage.
- They are sent instantly and don't rely on human delivery, which is prone to errors.
- Your voters don't have to send anything back — they simply follow the instructions in the email and cast their vote, which saves time.

Your voters will love how easy and simple it is to vote online, and so will you!

Watch ElectionBuddy's remote online voting in action

On-Site Online Elections

As the name implies, on-site voting is when an election is performed by a voter in person. This commonly occurs at annual general meetings and is also done during municipal, provincial/state, and federal elections.

However, unlike municipal/provincial/state, and federal elections, on-site online voting does not require a paper ballot. And, unlike an AGM voting process (which may be performed in a more informal way, such as a show of hands), you still get to reap the benefits of a formal voting process when online voting is used — namely, election integrity and security.

If budget is a major factor for your elections, online voting can help drastically reduce the costs of your on-site election. The obvious savings of online polls include those from not having to print paper ballots for your voters, but there are other savings as well. For example, paper ballots require manpower for distribution, collection, and tabulation, and those people must be paid for their work. But with an internet voting vendor, none of those elements of the election will be necessary. No physical space is required for ballot storage with online polling, and there aren't any costly tabulation errors when a computer algorithm does the counting. Furthermore, if time is money (like the old saying goes), then you'll save money on all the time saved from having ElectionBuddy do most of the legwork during the election.

Another major theme with online voting for on-site elections is convenience. When a computer program performs tasks and responsibilities that conventionally need to be completed by hand, this is known as automation, and it is through automation that convenience is achieved. It is extremely convenient to not have to manually distribute, collect, and tabulate ballots, on top of the financial impact of not having a human do these things. ElectionBuddy automates the majority of the voting process, so you can stay focused on more important things.

2.2 Tools and Softwares used

Online voting system is a web application which is developed to conduct election processes through the internet. This application is made in PHP and MySQL. It is divided into two modules.

2.2.1 Tools

Voter Module

- Voter Registration
- Voter Login
- Voter Dashboard - Voter can see his profile info, voting status, and list of groups
- Voting - Voter can choose to vote to anyone group listed in his dashboard
- Logout

Group Module

- Group Registration
- Group Login
- Dashboard - Group can see its profile info, voting status, and list of groups
- Voting - Group can choose to vote to anyone group listed in his dashboard
- Logout

2.2.2. Technologies used

- Front-End - HTML & CSS
- Back-End - PHP
- Database - MySQL

Applications Required

- Code editor - Notepad / VS Code / Sublime Text
- Browser - Chrome / FireFox
- XAMPP / WAMP / MAMP / LAMP

How to import database

1. Download the project file and unzip it on desktop
2. Open XAMPP Control Panel, and Start Apache and MySQL
3. Click on Admin button on right side of MySQL
4. Create new database with name online-voting-system
5. Import online-voting-system.sql from Project/db_file/
6. Scroll down and click on Go Database file imported successfully

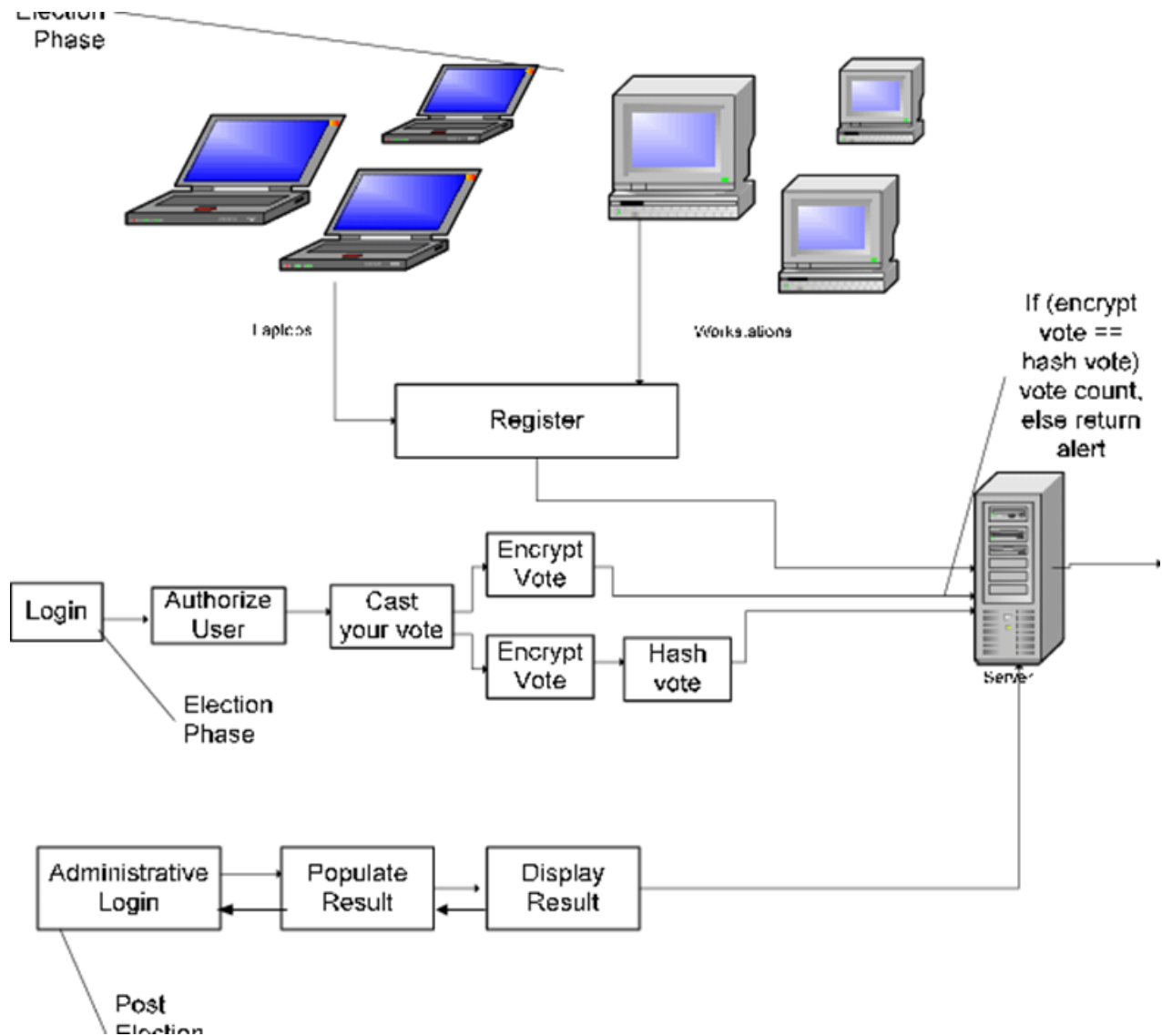
How to run project

1. Download the project file and unzip it on desktop
2. Open the file and copy Project folder and paste it into xampp/htdocs/
3. Open XAMPP Control Panel, and Start Apache and MySQL
4. Make sure that Apache and MySQL is started properly
5. Open Browser and type localhost/Project/Output is ready on screen

CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture



CHAPTER 4

ARCHITECTURE WORKING

4.1 WORKING :

The electronic voting system was designed to enable the overall populace to vote over wireless medium, and the system is opened to the voter and the administrator. The primary aim of the design is to provide a secured system over wired and wireless connection. The design architecture follows conceptual perspective of the three layered Organization for the advancement of Structured Information Standards (OASIS): the pre-election phase, election phase and the post-election phase

The pre-election phase provides an aspiring voter a phase to register his/her identity into the system. The process involved providing input access for qualified voters, and thereafter, the system automatically generates a unique id, unique grid card that matches directly with the unique id generated by the system, and then a unique short message service (SMS) one time pin is also generated by the system.

This generated on time random array of pin is then automatically sent to the aspiring voter in a form of Short Message Service (SMS) to the user if he/she meets the requirement to vote. The pre-election has several operations involved in it. The first operation involves the registration phase, whereby each aspiring client registers his/her profile. During registration, some fields such as phone number and email address would be made mandatory for clients to fill data in. After registration, a soft random grid card code is generated by the system for each user.

Also, an SMS containing a random array of America Standard Code for Information Interchange (ASCII) would be sent to the registered clients' phone number. All details pertaining to registration are stored in the database. The election phase involves voting, the voter uses the randomly generated SMS pin, and then the grid card code, to vote, coupled with his/her registered number (unique id). The vote when casted is encoded with a private key.

The encoded result is divided into two parts. One part of the encoded result is further hashed using the SHA256 (secured hash function) and a 256 bit random number is generated. The first encoded result and the hashed function is then sent to the database to be processed at the post-election phase.

CONCLUSION

Online Voting Systems have many advantages over the traditional voting system. Some of these advantages are less cost, faster generation results, easy accessibility, accuracy, and low risk of human and mechanical errors. It is very difficult to develop an online voting system which can allow security and privacy on the high level. Future development focused on designing a system which can be easy to use and will provide security and privacy of votes on an acceptable level by proper authentication and processing section.. It is easy to use and it is less time consuming. It is very easy to debug.

The developed secured electronic voting system has been tested and implemented on different electronic platforms which include personal computer, tablets and mobile phones. The electronic voting system automates the manual voting system by providing a platform in which users can vote using devices that are connected together in a network environment. Also, the issue of security was implemented by enforcing both integrity measure and authentication measure of the electronic voting system. The result of voted candidates and how integrity checks are achieved on each user's vote has been presented in this work.

In future, it is recommended that further works should consider the following factors in order to ensure a fully secured electronic voting system, and which would serve as a basis for an implementation of trusted e-governance through a secured e voting system.

- i. Include biometric systems to capture the real identity of voters.
- ii. Extend to other security requirements of electronic voting systems such as nonrepudiation, privacy and confidentiality.

REFERENCES

- J. Wen-Shenq, L. Chin-Laung and L. Horng-Twu, "A verifiable multi-authority secret election allowing abstention from voting," *The Computer Journal*, Vol. 45(6), pp. 672–82, 2002.
- A. K. M. Rokibul and S. Tamura, "Electronic Voting Using Confirmation Numbers," *Proceedings of the 2009 IEEE International Conference on Systems, Man and Cybernetics*, San Antonio, TX, USA, pp. 4672–77, 2009.
- K. Sampigethaya and R. Poovendran, "A framework and taxonomy for comparison of electronic voting schemes," *Elsevier Computers and Security*, Vol. 25, pp. 137-153, 2006.
- B. Lee, C. Boyd, E. Dawson, K. Kim, J. Yang and S. Yoo, "Providing Receipt-freeness in Mixnet-based voting protocols," *Proceedings of the ICISC '03*, pp. 261–74, 2003.
- B. Riva and A. Ta-Shma, "Bare-Handed Electronic Voting with Preprocessing," *Proceedings of the USENIX/Accurate Electronic Voting Technology Workshop*, Boston, MA, 2007.
- B. Lee, and K. Kim, "Receipt-free electronic voting scheme with a tamper-resistant randomizer", *ICISC 2002*, LNCS 2587, Springer-Verlag, pp. 389–406, 2002.
- J. Schweisgut, "Coercion-resistant electronic elections with observer," *2nd International Workshop on Electronic Voting*, Bregenz, August 2006.
- D. Sandler, K. Derr and D. S. Wallach, "VoteBox: a tamper-evident, verifiable electronic voting system," in *proceedings of the 17th USENIX Security symposium*, pp 349-364, July 28- August 1, San Jose, California, 2000

CODE

CLICK ON LINK :

<https://github.com/Anushanetha/Online-voting-system.git>