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Online Voting System using Web-Based Application

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ABSTRACT: The online voting system is designed to modernize and streamline the voting process, aiming to reduce the time and effort associated with traditional voting booths. This web-based application allows voters to cast their votes securely and anonymously through an intuitive user interface (UI). The system includes a login page for user authentication, a display of political parties with their symbols, an option to select the preferred party, and a submission mechanism for recording votes. The front-end is built using different Technologies for a responsive and user-friendly design, while the back-end utilizes MySQL for secure data storage. The application follows the Model-View-Controller (MVC) architecture, which separates the data, presentation, and control logic, ensuring maintainability and scalability. Voter information and total votes are stored in the database, though votes are cast anonymously to preserve privacy. The system aims to simplify the voting process, enhance voter participation, and ensure the integrity of the election process by providing a secure, efficient, and accessible platform for voting.

I. INTRODUCTION

Online voting system is developed for Indian elections. The proposed model has a greater security in the sense that voter high security password is confirmed before the vote is accepted in the main database of Election Commission of India. The additional feature of the model is that the voter can confirm if his/her vote has gone to correct candidate/party. In this model a person can also vote from outside of his/her allotted constituency or from his/her preferred location. In the proposed system the tallying of the votes will be done automatically, thus saving a huge time and enabling Election Commissioner of India to announce the result within a very short period.

SCOPE OF THE PROJECT

In the proposed system the tallying of the votes will be done automatically, thus saving a huge time and enabling Election Commissioner of India to announce the result within a very short period. Voting system is aimed at developing a web-based system. This system is completely automated. In this system, the person can register online and do many things. The details of all the things are made available to them through the single website.

II. LITERATURE SURVEY

A Survey on Security Methodologies in E-Voting System, R. Suganya, Dr. Rajendran Anandha Jothi, and Vellaiyan Palanisamy, (2024), This paper discusses the importance of security in modern electronic voting systems used in elections. The authors explain that E-voting systems collect and process voter data digitally in both online and offline environments, making security a critical factor. The study mainly focuses on retina-based authentication mechanisms, which are considered more secure and reliable than traditional fingerprint-based systems. The paper also analyzes various cryptographic algorithms such as RSA and MD5 that are implemented to protect voter information and ensure secure communication. A comparative study of different security methodologies is presented to evaluate their effectiveness in preventing unauthorized access and fraud. The authors conclude that retina security combined with advanced encryption algorithms provides stronger protection and higher reliability for future E-voting systems.

Researchers Find Critical Backdoor in Swiss Online Voting System, Kim Zetter, (2019), This article highlights a serious security vulnerability discovered in Switzerland's online voting system by an international group of researchers. The flaw existed in the cryptographic verification mechanism, which was intended to ensure that all counted votes matched the votes cast by voters. According to the researchers, the hidden backdoor could allow attackers to replace legitimate ballots with fraudulent ones without being detected. The article emphasizes the risks associated with poorly designed cryptographic implementations in internet voting systems and demonstrates how even advanced voting platforms can be vulnerable to manipulation. The study raises concerns about transparency, trust, and the reliability of

online voting systems, stressing the need for rigorous security audits and independent verification before large-scale deployment.

Interfacing of Online and Offline Voting System with an E-Voting Website, Neelam Keerthi, Annam Raghuram, and Ramesh Jayaraman, (2022), This paper presents a hybrid voting model that integrates both online and offline voting systems through an E-voting website. The study explains how the Election Commission of India (ECI) is adopting advanced technologies such as VVPAT and Electronic Voting Machines (EVMs) to improve election transparency and efficiency. However, challenges such as voter verification issues and low polling percentages due to migration still remain. To overcome these problems, the authors propose embedding face recognition technology into EVMs using Raspberry Pi devices for secure voter authentication. The online voting platform allows migrated citizens and overseas voters to participate in elections from remote locations while maintaining updated voter records and voting status. Experimental results show that the proposed system improves accessibility, reduces malpractice, and increases overall voting efficiency. The paper concludes that integrating online and offline voting methods can significantly improve participation rates and election management.

E-Voting System Evaluation Based on The Council of Europe Recommendations: Helios Voting, L. Panizo Alonso, M. Gasco, D. Y. Marcos del Blanco, J. A. Hermida Alonso, J. Barrat, and H. Alaiz Moreton, (2021), This paper evaluates the Helios Voting system based on the recommendations established by the Council of Europe for secure electronic voting. The study examines whether the Helios platform satisfies important requirements such as transparency, voter privacy, verifiability, integrity, and accessibility. The authors analyze the cryptographic techniques and auditing mechanisms used in the system to ensure secure vote casting and counting. The paper also discusses the strengths and limitations of Helios in terms of usability and resistance to cyberattacks. Through this evaluation, the study highlights the importance of international standards and regulatory guidelines in developing trustworthy E-voting platforms. The authors conclude that although Helios demonstrates several strong security features, continuous improvements and testing are necessary to ensure complete reliability and public trust in electronic elections.

III. EXISTING SYSTEM

In the existing traditional voting systems, several challenges hinder the efficiency and accessibility of the voting process. Voters must physically go to a voting booth, often facing long wait times, which can be particularly inconvenient for those with limited mobility or tight schedules. Additionally, the process is prone to human errors such as miscounting votes, delays in data entry, and potential for vote tampering. Moreover, traditional voting systems lack transparency and are vulnerable to fraud or manipulation. The entire process of manually counting votes is time-consuming, which delays the final results. In contrast, the web-based voting system described in the previous paragraph addresses many of these issues by offering a faster, more secure, and accessible voting experience. It eliminates the need for physical presence at a voting booth, reduces human errors by automating the vote collection and tallying processes, and ensures transparency and security through digital record-keeping.

Disadvantages of Existing System:

- Time Consuming.
- Accessibility Issues.
- Manual vote counting can lead to errors, miscounting, and delays, which may affect the accuracy and timely declaration of results.

IV. PROPOSED SYSTEM

The proposed system is an online voting platform designed to offer a more efficient, secure, and accessible alternative to traditional voting methods.

This web-based application allows eligible voters to cast their votes remotely, eliminating the need for physical presence at polling stations, thus reducing long wait times and accessibility barriers.

Voters can log in securely to the platform, where they are presented with a list of political parties represented by their respective symbols. After selecting their preferred party, they can submit their vote anonymously.

The application is built using modern web technologies, ensuring a responsive, user-friendly interface and secure data storage. By implementing the Model-View-Controller (MVC) design pattern, the system ensures a clean separation of

data, logic, and presentation, which improves maintainability and scalability.

While votes are cast anonymously to protect voter privacy, the system stores necessary information such as voter identity and vote tally securely in the backend database.

Advantages of Proposed System:

- Convenience and Accessibility.
- Time Efficiency.
- The digital nature of the system makes it easier to track and audit votes, offering greater transparency and fostering trust in the election process.
- Aadhar's database permits only eligible voters to vote and, it also ensures that eligible voters vote only once.

V. SYSTEM ARCHITECTURE

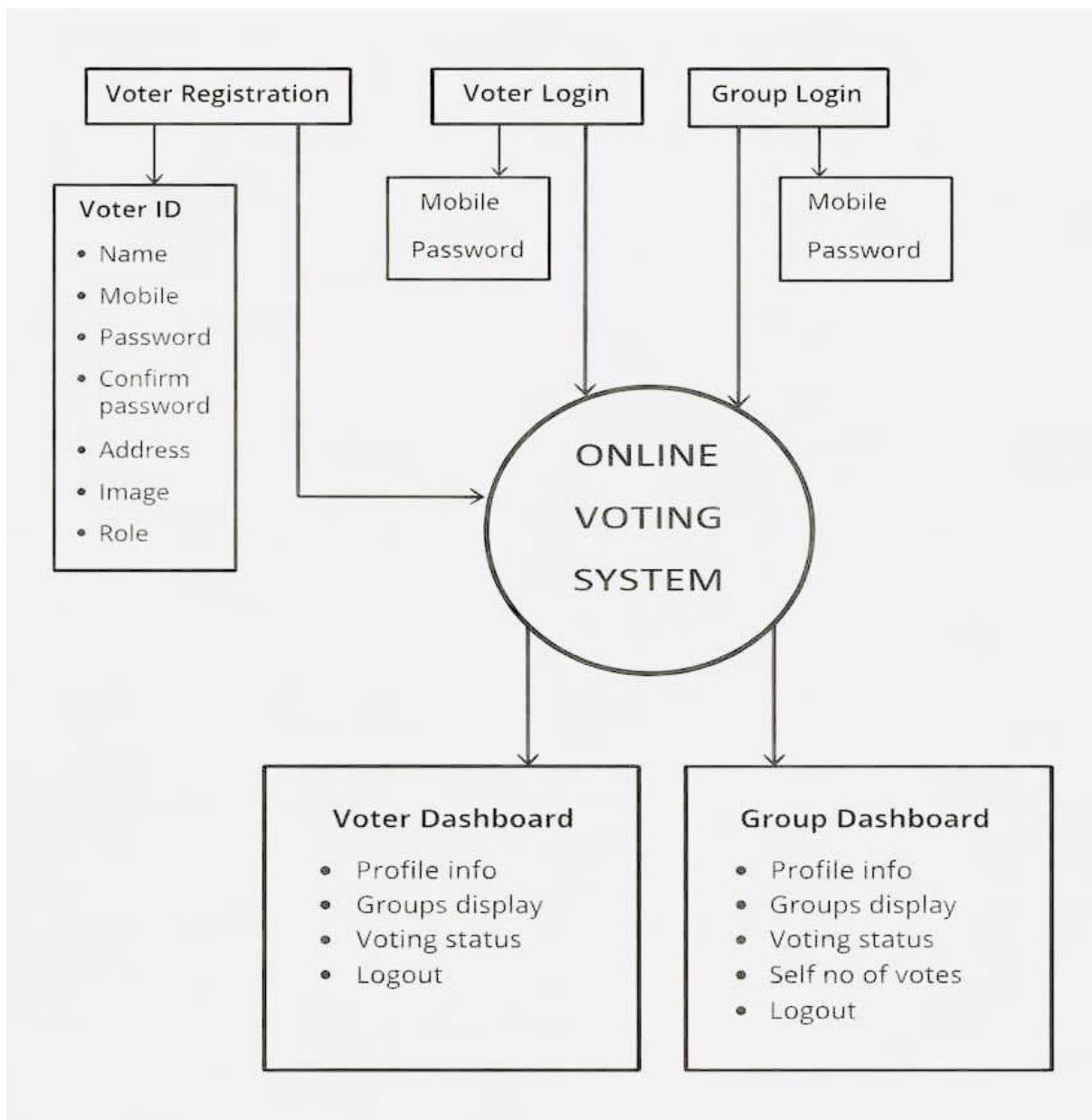


Fig 1.1 System Architecture

The system architecture of an Online Voting System consists of different modules such as voter registration, voter login, group login, voter dashboard, and group dashboard connected through a central online voting system. In the voter registration module, users provide details like voter ID, name, mobile number, password, address, image, and role to create an account. Registered voters and groups can log in using their mobile number and password for secure authentication. The central online voting system manages all activities including storing user data, verifying login credentials, recording votes, and updating voting status. After login, voters can access the voter dashboard to view profile information, see available groups or candidates, check voting status, cast their vote, and logout. Similarly, groups or candidates can access the group dashboard to view profile details, monitor voting status, check the number of votes received, and logout. This architecture ensures secure, transparent, fast, and efficient online election management. Data is stored in relational databases, while deployment on cloud platforms ensures high availability, security, and reliable global access.

VI. METHODOLOGY

Modules Name:

- User Interface Design
- Admin
- Candidates
- Users

1) User Interface Design:

This is the first module of our project. The important role for the user is to move login window to user window. This module has created for the security purpose. In this login page we have to enter login user id and password. It will check username and password is match or not (valid user id and valid password). If we enter any invalid username or password we can't enter into login window to user window it will shows error message. we are preventing from unauthorized user entering into the login window to user window. It will provide a good security for our project. server contain user id and password server also check the authentication of the user. It will improve the security and preventing from unauthorized user enters into the network. In our project we are using JSP for creating design

2) Admin Module:

Admin can login to the system by default user name and password then he can change the login credentials. Admin can accept or reject the users and political parties. Admin can view the list of parties and users. Admin has to announce the election dates and results. Admin has to maintain previous records and generate reports based on previous records.

3) Candidates Module:

Candidates have to enroll them self with party name, name, age, gender etc. Candidates can view other registered candidates. Candidates can login after admin acceptance only.

4) Users Module:

Users have to enroll them self with name, mobile, email, address, Aadhar number etc. Once admin accepts the registration users can login into system and they can view list of parties. They can vote. Users can change the passwords and update the profile. They can view election results.

VII. ANALYSIS AND DISCUSSION

An Online Voting System is a web-based application that allows voters to cast their votes electronically through the internet. It replaces the traditional paper ballot method with a digital process, making elections faster, easier, and more efficient. The system is commonly used in colleges, organizations, and government sectors for conducting secure elections.

1. Security Analysis

Security is the most critical aspect of an Online Voting System because it ensures fairness, privacy, and accuracy in elections. The system uses authentication methods such as usernames, passwords, OTP verification, and encrypted communication to protect voter information. It prevents unauthorized access and duplicate voting by validating each voter before vote submission. Secure databases and access control mechanisms help maintain data integrity. However, the system may still face challenges such as hacking, phishing attacks, malware, and data breaches. Therefore, strong cybersecurity measures, regular updates, and secure server management are essential for safe election operations.

2. Performance and Efficiency

Performance analysis evaluates how efficiently the system operates during elections. An Online Voting System must process voter requests quickly and accurately, especially when many users access the system simultaneously. Good system performance includes fast login authentication, quick vote submission, minimal response time, and accurate result generation. Database optimization and efficient server management improve processing speed. If the system performance is poor, users may experience delays, server crashes, or failed vote submissions, affecting the reliability of the election process.

3. Scalability Analysis

Scalability analysis measures the ability of the system to handle increasing numbers of users and election data. A scalable Online Voting System can support thousands or even millions of voters without reducing performance. Cloud computing, distributed servers, and load balancing techniques help improve scalability. The system should allow easy expansion of storage, bandwidth, and processing power as voter participation increases. Proper scalability ensures that the system remains stable and efficient even during peak voting periods.

4. Usability and Practical Implementation

Usability refers to how easy and convenient the system is for voters and administrators to use. The Online Voting System should have a simple and user-friendly interface so that users with basic computer knowledge can vote without difficulty. Clear instructions, simple navigation, and accessible design improve user experience. In practical implementation, the system can be deployed in schools, colleges, organizations, and government elections. Proper training, technical support, and internet availability are important for successful implementation.

5. Comparison with Existing Systems

Compared to traditional paper-based voting systems, the Online Voting System provides faster vote counting, reduced paperwork, lower operational costs, and quicker result generation. Traditional systems require physical polling stations, manual counting, and large human resources, which consume more time and effort. In contrast, online systems automate the election process and allow remote voting from different locations. However, traditional systems are often considered more trusted because they are less vulnerable to cyberattacks and technical failures. Online voting systems provide greater convenience but require strong security mechanisms to maintain trust and reliability.

6. Discussion

The Online Voting System is a modern technological solution that improves the efficiency and accessibility of elections. It offers benefits such as speed, transparency, reduced manual work, and increased voter participation. At the same time, issues related to cybersecurity, privacy, and internet dependency remain important concerns. Successful implementation requires secure infrastructure, reliable servers, and proper monitoring mechanisms. With continuous technological advancements and strong security practices, online voting systems can become a reliable alternative to traditional election methods in the future.

VIII. CONCLUSION

The Online Voting System is an efficient and reliable solution for conducting elections digitally. It simplifies the voting process by reducing manual work, paperwork, and time consumption while providing fast and accurate results. The system improves transparency, accessibility, and convenience for both voters and administrators. Security features such as authentication and data protection help maintain the confidentiality and integrity of votes. The project also demonstrates good performance, scalability, and usability, making it suitable for schools, colleges, organizations, and large-scale elections. Although challenges like cybersecurity threats and internet dependency exist, they can be minimized through proper security measures and regular system maintenance. Overall, the Online Voting System is a modern approach that enhances the efficiency and reliability of the election process.

IX. FUTURE ENHANCEMENT

The Online Voting System can be further improved by adding advanced security features such as biometric authentication, blockchain technology, and AI-based fraud detection to increase transparency and security. Mobile application support can be introduced to make voting more accessible and convenient for users. Cloud integration and distributed servers can improve scalability and system performance during large-scale elections. Multi-language

support and accessibility features for differently-abled users can also enhance usability. In the future, the system can be integrated with national identity databases to provide more secure and efficient election management.

REFERENCES

- [1] Rajesh M. Ghadi1, Priyanka S. Shelar ONLINE VOTING SYSTEM ,12 | Dec-2017 <https://www.irjet.net/archives/V4/i12/IRJETV4I12256.pdf>
- [2] Aakash1, Aashish1, Akshit1, Sarthak11 ONLINE VOTING SYSTEM, Students Dept. Of Computer Science. Indraprastha Engineering College. A.P.J. Abdul Kalam Technical University, Voting 09 | March-2017 <https://www.coursehero.com/file/15933925-2/SSRN-id3589075pdf/>
- [3] ONLINE VOTING SYSTEM USING CLOUD International conference on Emerging Trends in Information Technology and Engineering (IC-ETITE) 10 | Feb-2020 https://www.researchgate.net/publication/340972420_Online_Voting_System_using_Cloud.
- [4] Cranor, L. (2004). Electronic Voting Hot List. Retrieved from <http://lorrie.cranor.org/voting/hotlist.html>
- [5] Dill, D. (2004). E-voting Misconceptions. Retrieved from www.verifiedvoting.org/article.php?id=2609.
- [6] Dill, D. Lecture, October 14, UC Berkeley.
- [7] Dugger, R. (2004). How They Could Steal the Election this Time. The Nation. Retrieved from www.thenation.com/doc.mhtml?i=20040816&s=dugger, July 29, 2004.
- [8] Appel, Andrew (27 June 2022). "How to Assess an E-voting System". Princeton University, Centre for Information Technology Policy. Archived from the original on 8 July 2022. Retrieved 1 July 2022.
- [9] Zetter, Kim (12 March 2019). "Researchers Find Critical Backdoor in Swiss Online Voting System". Vice. Archived from the original on 2 September 2020. Retrieved 20 June 2020.
- [10] Gupta, Manhar. "Russia's Blockchain Voting Turned into a Fiasco". Crypto trends. Archived from the original on 19 October 2020. Retrieved 25 June 2020.
- [11] Gaudry, Pierrick, and Alexander Golovnev (10 February 2020). Breaking the Encryption Scheme of the Moscow Internet Voting System (PDF). Financial Cryptography 2020 – via International Financial Cryptography Association.
- [12] Anderson, Ross (21 February 2020). "Electronic voting systems". The RISKS Digest. 31 (59). Archived from the original on 19 October 2020. Retrieved 23 June 2020 – via Newcastle University.
- [13] Zetter, Kim (13 February 2020). "'Sloppy' Mobile Voting App Used in Four States Has 'Elementary' Security Flaws". VICE. Archived from the original on 20 September 2020. Retrieved 23 June 2020.
- [14] Bochsler, Daniel (26 May 2010). "Can Internet voting increase political participation?" (PDF). Centre for the Study of Imperfection in Democracies. Archived (PDF) from the original on 18 September 2016.
- [15] Perez, Edward, and Gregory Miller (March 2019). "Georgia State Election Technology Acquisition, A Reality Check". OSET Institute. Archived from the original on 30 July 2020. Retrieved 6 March 2020.
- [16] Fowler, Stephen. "Here's What Vendors Say It Would Cost to Replace Georgia's Voting System". Georgia Public Broadcasting. Archived from the original on 28 February 2020. Retrieved 28 February 2020.
- [17] L. PANIZO ALONSO, M. GASCÓ, D. Y. MARCOS del BLANCO, J. Á. Hermida Alonso, J. Barrat and H. Alaiz Moreton, "E-Voting System Evaluation Based on The Council of Europe Recommendations: Helios Voting", IEEE Transactions on Emerging Topics in Computing, vol. 9, no. 1, pp. 161-173, Jan.-March 2021.
- [18] S. L. Rithwik, D. Sai Teja and Ramesh Jayaraman, "Enhancement of Electronic Voting Machine Performance Using Fingerprint and Face Recognition", 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), pp. 757-763, 2021.

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