Online Voting System

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Abstract - *The **Online Voting System** is a secure, user-friendly web-based application developed to streamline and digitize the traditional voting process. The **aim** of this project is to develop an efficient and transparent platform that enables eligible voters to cast their votes online, ensuring integrity, accessibility, and ease of use. The **main goals** of the project include: Reducing manual errors and physical effort involved in conventional voting. Providing a secure authentication mechanism to prevent fraudulent votes. Ensuring real-time result generation and data transparency.*

*In this project, we developed a fully functional online voting website using **HTML, CSS, PHP, and MySQL**. The system includes several core modules: **user registration with Aadhar/PAN verification, OTP-based login, admin panel for voter verification and election scheduling**, and **real-time vote counting and result display**.*

*We also focused on implementing **security features** such as encrypted data handling, session-based login, and restricted access to the admin dashboard. The system ensures that each voter can cast only one vote and that their vote remains confidential.*

Overall, this project demonstrates how digital technology can enhance the democratic process by making voting more accessible, secure, and efficient.

***Key Words**: secure data transmission, real-time updates, and accessibility.*

1. INTRODUCTION

Online voting is a simple tool that can provide profound change for organizations that use its full potential. The introduction of online voting systems can help create simpler, more secure, and more inclusive elections.

Historically, voting involved paper ballots, physical boxes, and counting votes by hand a time-consuming and error prone method. With the advent of digital technology, the electoral process became more efficient and secure. However , online voting systems are easy to understand but difficult to make the most of. This article will look at how organizations can do just that. An Online Voting System is a secure, digital platform designed to enable eligible voters to cast their votes in elections via the internet.

2. OBJECTIVES

The OVS was developed with the following objectives:

1. **User-Friendly Interface**: Ensure accessibility and ease of use for all users (admins, voters, candidates).
2. **Comprehensive System**: Manage voters information and administrative tasks within a single platform.
3. **Data Integrity**: Ensure accuracy through automated data entry and validation, while reducing redundancy via centralized storage.
4. **Scalability**: Provide features adaptable to the evolving needs of mid-sized institutions.
5. **Real-Time Analytics**: Integrate feedback mechanisms and data analytics for informed decision-making.

How Achieved: Data accuracy is maintained through automated processes (e.g., Voter logging), redundancy is minimized by a unified database, and scalability is supported by modular design.

3. MODULES OF PROJECT

Module 1: Admin module User Management.

- **Admin Registration:** Admin provides email and password.
- **Voter Verification:** To maintain election integrity, voter accounts must be verified by the admin before being activated.
- **Scheduling Elections:** The admin can schedule elections. Set Start and End Time for voting Assign Election Title and Description.
- **Voting Analysis :** Admins can view real-time graphical analytics of the voting process. shows Total Voter Turnout (bar chart)Votes per Candidate (live updating chart**).**
- **Purpose:** To Control and Manage the System, Manage Voter Registrations and Election Managenent.

Module 2: Voter Registration

- **Personal Information:** To allow voters to securely register in the online voting system by submitting their

personal and identity information, including name,address ,gender,etc.
- **Document Verification:** Aadhaar Verification via UIDAI - API mock validation for project)Cross-check Voter ID with Aadhaar. PAN Verification using basic format checks or government gateway.
- **PAN Verification** using basic format checks or government gateway (optional).
- Cross-check Voter ID with Aadhaar.
- Admin can view, verify, approve, or reject user registrations.

Purpose- To Identify and verify voters and Enable Secure Login.

Module 3:User Login.
- **Voter Login:** Login with Registered Mobile Number.
- **OTP Verification:** Generate random 6-digit OTP and Match OTP with backend stored/generated OTP**.**
- **Voting Process After Successful OTP Login:**Show List of Active Elections (based on eligibility)Show Candidate List with:Candidate Name,Party Symbol and Photo.
- **Voting Rules**:Only one vote allowed per election.
- **Vote Submission:**User selects candidate Confirmation prompt (Yes/No)

- **Purpose :-** Ensure each voter can cast their vote only once in a particular election and that their choice is securely and anonymously stored in the system.

Each module is designed to enhance efficiency and streamline workflows specific to its user group.

4. SECURITY AND PRIVACY

The OVS incorporates robust security measures:

Aadhaar & PAN Verification: Helps prevent impersonation or fake registrations.
- **Voter Authentication Security:**OTP-Based Login: Voters authenticate using OTP sent to their registered mobile number.
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- **Data Encryption & Privacy**: All communication between the user and server is encrypted using HTTPS/SSL**.** Sensitive data like Aadhaar and PAN are encrypted in the database.

- **System Abuse Prevention:** Only verified users (via Aadhaar/PAN/Voter ID) can access the system**.**

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- SQL Injection Protection by sanitizing inputs.
- **Audit Trails & Logging:** Every action (registration, login, vote casting, admin activity) is logged.
- **Privacy Protection**:Voter **identity is never linked to the vote.**
- **Enhancement:** Future iterations could adopt HTTPS for secure data transmission and regular security audits.

5. REQUIREMENT

The development of the OVS utilized the following hardware and software resources:

| Name of Equipment	Specification	Cost	Available
Laptop / Desktop	64 bit, 2.5 GHz or fast, Storage: 1 TB or more (SSD recommended),	Rs. 55,000	Yes
Operating System	Linux or Windows Server.	-	Yes
Visual studio code	17.0	Free	Yes
Xampp server	3.2.3.0	Free	Yes
HTML	Html5	Free	Yes
Proper PHP setup	Proper setup in vs code	Free	Yes
Firefox/Chrome	Latest version	Free	Yes
Localhost	80 or 3306 port	Free	Yes
Total		**Rs 59,100**	

Table: Materials used.

These resources ensured a cost-effective and efficient development process.

Note: Tools were chosen for their cost-effectiveness, compatibility with web development (e.g., PHP and MySQL), and widespread use in academic projects. Alternatives like Apache or paid IDEs were considered but not adopted due to budget constraints.
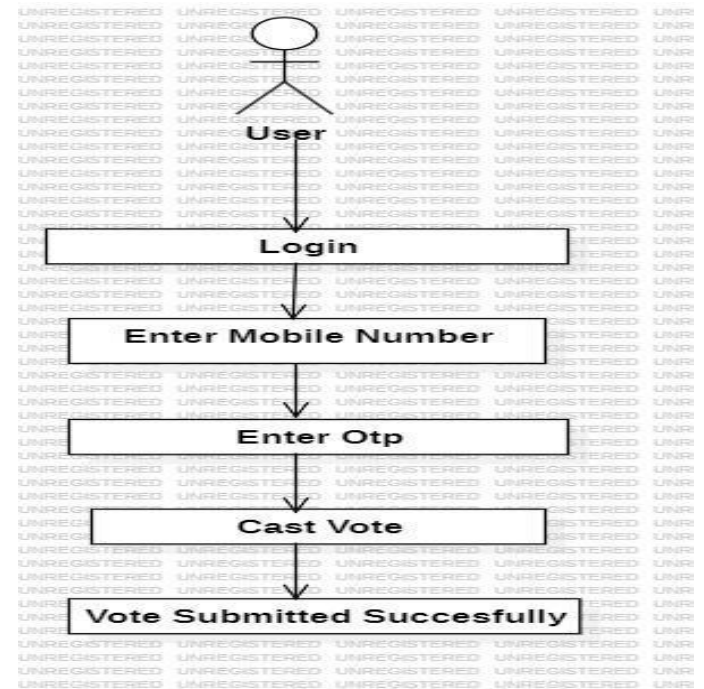
6. DIAGRAMS

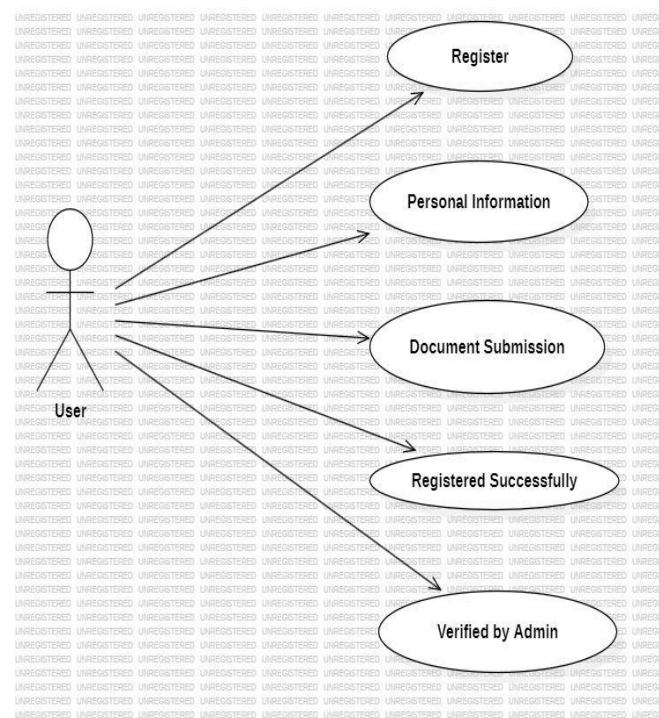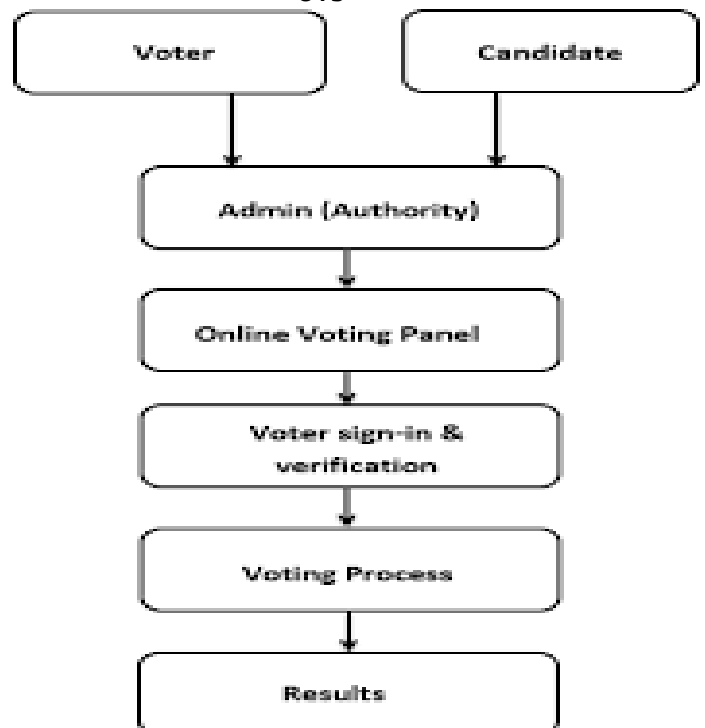This paper includes activity diagrams for each module to illustrate workflows:

Admin Panel
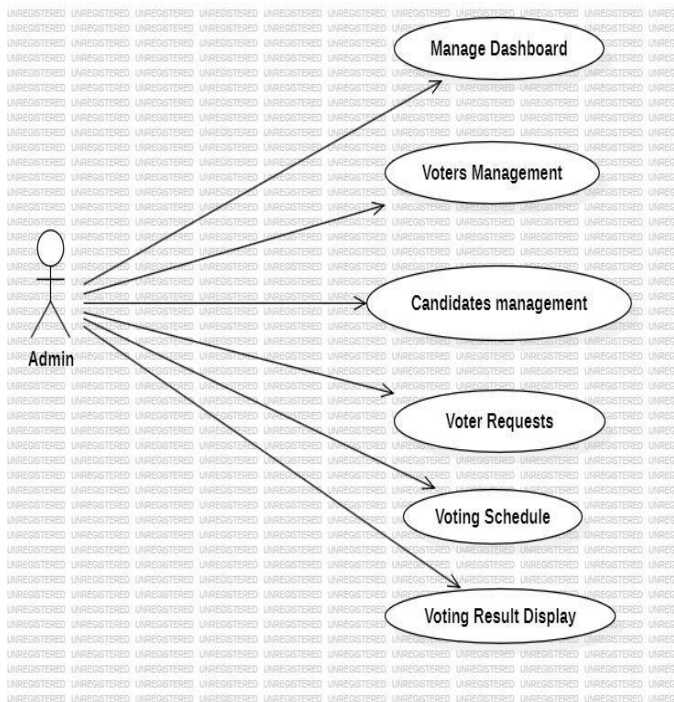
User Login

User Registration

OVS

7. RESULT AND DUSCUSSION

Real-time web voting system (2024)
The Deployment Of OVS yielded Significant improvement: Hosted online, allowed global access, delivered instant vote counts, user-friendly UI, secured database a successful proof-of-concept but noted need for future scaling & advanced security **.**
Demonstrated strong use of public-key encryption, high usability, >50% speed improvements in vote counting, but acknowledged ongoing needs for privacy and legal standards .
Campus/educationalsystems:
Studies show e-voting is more convenient and privacy-preserving than manual voting, boosting satisfaction and reliability

8. CONCLUSION:

- The Online Voting System project successfully achieves its goal of providing a secure, transparent, and accessible digital platform for conducting elections. Through the use of web technologies such as **HTML, CSS, PHP, and MySQL**, we have created a functional prototype that simplifies the voting process while maintaining the integrity and confidentiality of voter data.
- By incorporating **OTP-based authentication**, **Aadhar/PAN verification**, and an **admin-controlled backend**, the system ensures only eligible users can participate and that each vote is counted accurately. The admin panel allows for real-time monitoring, voter verification, election scheduling, and result analysis making the entire process efficient and manageable.
-This project demonstrates how technology can play a key role in modernizing democratic practices, especially in a large and diverse country like India. It also sets the foundation for future improvements such as biometric verification, blockchain integration, and multi-language support to enhance security and user experience further.

9. REFERENCE:

1.Okediran et al. (2012): Benefits of e-voting—improved security, confidentiality, cost savings, instant tallying
2. VVSG 2.0 (2021): Defines requirements for software independence, auditability, accessibility, and cryptographic integrity.