E-Voting System (Final Year Project)

Introduction

The E-Voting System is a secure, web-based platform developed to facilitate digital voting for elections. It ensures voter authentication using OTP verification during **vote casting**, while providing a powerful admin interface to manage the entire election process. Admins can add candidates, and control when users can access the voting and result pages.

Objectives

- Create an online platform for conducting elections.

- Implement OTP verification at the vote casting step.

- Prevent multiple voting from a single user.

- Provide an admin dashboard to control elections and results visibility.

- Make the system scalable and secure.

Technologies Used

- **Frontend**: HTML, CSS, JavaScript

- **Backend**: Node.js, Express.js

- **Database**: MySQL

- **OTP Verification**: SMS Gateway (phone number mapped via account number)

- **Development Tools**: VS Code, WAMP

Methodology

1. **User Access and Interface**

   o Users enter their **account number**, which maps to a stored phone number.

   o They view a voting interface displaying candidates.

2. **OTP Verification During Vote Casting**

   o Once the user selects a candidate and clicks "Vote", an OTP is sent to their registered phone number.

- o The system verifies the OTP before storing the vote securely in MySQL.

3. **Vote Recording and Validation**

   - o The vote is stored only after successful OTP verification.

   - o User is marked as "voted" using account number, preventing re-voting.

4. **Admin Panel**

   - o Admin logs in via a secure page.

   - o Admin functionalities include:

     - ▪ **Add/Delete/Edit Candidates**

     - ▪ **Enable or Disable Voting Page** (so users can only vote during the election time)

     - ▪ **Enable or Disable Result Page** (results become visible when the admin allows it)

Source Code:

GitHub Link:

https://github.com/aravinthan-126/Coding_Answers/tree/main/E-Voting%20System

Features

- OTP Verification **at vote time**

- Each voter can vote **only once**

- **Admin Dashboard** with:

  - o Candidate management

  - o Page control for voting and result visibility

- Real-time vote storage in MySQL

- Responsive UI for both user and admin

- Secure backend API with validations

Challenges and Solutions

- **Voting Page Control**: Solved using a database flag that admin can toggle via dashboard.

- **User Confusion**: Clear messaging added to show when voting/result pages are disabled.

- **Vote Duplication**: Prevented by checking if a user already voted before sending OTP.

- **OTP Handling**: Retry logic added in case of failed OTP delivery.

Future Enhancements

- Add visual graphs and charts to admin result view

- Use Blockchain for vote tamper-proofing

- Add role-based access for multiple admins

- Integrate Face or Fingerprint biometric validation

Conclusion

The E-Voting System is a complete, functional platform for conducting digital elections securely and efficiently. The inclusion of OTP-based vote authentication and a flexible admin dashboard ensures a smooth and controlled election experience. This solution is ideal for institutions looking to modernize their election process.