

# **Genpact**

## **Voting Application**

### **Java Batch 2 (Group1)**

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## **Abstract**

In the digital age, the evolution of voting mechanisms is pivotal for promoting democratic participation and accessibility. This abstract introduces an innovative Online Voting Application designed to facilitate secure and convenient elections and polls through a user-friendly web page interface. Our application aims to streamline the voting process by offering a robust and accessible platform that enables registered users to cast their votes remotely. Through this, we eliminate the need to cast your votes using paper or having to gather in a place where a voting terminal is available. This helps the voters to be flexible, secure their personal details, access, and convenience, Increase the voting turnout, real-time results, reduce paper usage, improve accuracy, security, etc, A significant step toward embracing technology for the advancement of democratic processes, offering citizens a secure and convenient means to exercise their right to vote. As digital democracy continues to evolve, this application contributes to a future where civic engagement is more accessible and efficient than ever before.

# **Introduction**

The tradition of paper-based voting has stood the test of time as the cornerstone of democratic elections. As society marches forward into the digital age, the emergence of e-voting applications has introduced a seismic shift in the way we participate in the democratic process. This introduction explores the convergence of old-world paper voting practices and the transformative effects brought about by electronic voting. For generations, the act of casting a vote involved visiting a physical polling station, marking a paper ballot, and dropping it into a ballot box—a ritual that symbolized civic duty and democratic participation. While this process has deep historical roots and is cherished for its tangible nature, it has not been immune to challenges. These challenges range from logistical complexities in organizing polling stations to the potential for human error in counting and reporting votes.

In the era of e-voting applications, electronic voting replaces the traditional paper ballot with a digital interface accessible via computers, smartphones, or specialized voting machines. This paradigm shift promises to revolutionize the electoral landscape in numerous ways.

Our E-voting system is used to securely conduct votes and elections. As a digital platform, we eliminate the need to cast your votes using paper or having to gather in person. Through a user-friendly web page interface, an online voting application is created to make elections and polls convenient and secure. By providing a reliable and usable platform that enables registered users to vote remotely, our program seeks to simplify the voting process. Our System allows users to create an account if that person is 18 or above 18 years of age. Our System will generate a unique 4-digit code at the time of account creation which will be used for login purposes at the time of voter login.

The advantages of E-voting are

- Flexible
- Secure their personal details
- Accessibility and convenience
- Increase the voting turnout
- Real-time results
- Reduce paper usage
- Improve accuracy
- Security, etc,

## **Technologies Used in E-Voting Applications**

- [1] Thymeleaf, CSS - designing page layout.
- [2] Java - all the logic has been written in Java.
- [3] MySQL - MySQL database has been used as a database.
- [4] Spring MVC- used to develop web applications.
- [5] JPA Repository - used for managing the data in a Spring Boot Application.
- [6] SpringSecurity - used for authentication.

# **Database Description**

A crucial component of any E-Voting Application is its database, as it plays a pivotal role in storing, managing, and ensuring the security of voter data, election information, and results. This section of the project report provides an overview of the database structure and its key elements.

These database tables are created with the help of JPARepository interface.

## **Database Schema:**

### **Admin**

- Description: Stores information about admin details.
- Fields:
  - id - Admin Id
  - name - Admin Name
  - password - Admin Password

### **Admin Role**

- Description: Stores information about the admin role to assign admin role.
- Fields:
  - aid - Admin Id
  - rid - Role Id

### **Candidate**

- Description: Stores information about who votes for candidates.
- Fields:
  - id - Primary Id
  - candidate1 – store who voted for candidate 1
  - candidate2 – store who voted for candidate 2
  - candidate3 – store who voted for candidate 3

## **Role**

- Description: Stores information about the roles presented.
- Fields:
  - id – Role Id
  - name - Admin Name
  -

## **Voter**

- Description: Stores information about Voter's details.
- Fields:
  - id - Voter Id
  - email – Voter Email Id
  - name - Voter Name
  - password - Voter Password
  - phone – Phone Number
  - photo – Voter Photo

## **Voter Roles**

- Description: Stores information about the voter role to assign the role.
- Fields:
  - vid - Voter Id
  - rid - Role Id

## **Technologies Description**

These technologies, when integrated effectively, enable the development of a secure, dynamic, and user-friendly E-Voting Application. Thymeleaf and CSS handle the presentation layer, MySQL manages data storage, Spring MVC and JPA Repository handle application logic and data access, while Spring Security ensures the security of the application, making it a comprehensive solution for modern digital democracy.

### **Thymeleaf:**

- Description: Thymeleaf is a server-side Java templating engine used for rendering dynamic HTML pages. It integrates seamlessly with Spring applications, allowing for the creation of dynamic and data-driven web pages.
- Usage in E-Voting Application: Thymeleaf can be employed to generate HTML templates for displaying election information, candidate profiles, and voting forms dynamically.

### **CSS (Cascading Style Sheets):**

- Description: CSS is a stylesheet language used for controlling the presentation and layout of web pages. It defines the visual style of web elements, such as fonts, colors, spacing, and responsiveness.
- Usage in E-Voting Application: CSS is essential for designing the user interface (UI) of the E-Voting Application, ensuring a visually appealing and user-friendly experience.

### **MySQL:**

- Description: MySQL is an open-source relational database management system (RDBMS) that is widely used for storing and managing structured data. It provides robust data storage and retrieval capabilities.

- Usage in E-Voting Application: MySQL can be used to store critical data such as user profiles, candidate information, election details, votes, and results securely and efficiently.

### **Spring MVC (Model-View-Controller):**

- Description: Spring MVC is a framework within the Spring ecosystem that facilitates the development of web applications. It follows the MVC architectural pattern, separating application logic into models, views, and controllers for maintainability.
- Usage in E-Voting Application: Spring MVC can be used to manage the application's routing, request handling, and interaction between the front-end (Thymeleaf templates) and back-end components.

### **JPA Repository (Java Persistence API Repository):**

- Description: JPA is a Java specification for managing relational data in Java applications. A JPA repository, often used with Spring Data JPA, simplifies database operations by providing a high-level, object-oriented interface for data access.
- Usage in E-Voting Application: JPA repositories can be used to interact with the MySQL database, making it easier to perform CRUD (Create, Read, Update, Delete) operations on data entities such as users, candidates, votes, and elections.

### **Spring Security:**

- Description: Spring Security is a robust framework for handling authentication and authorization in Java applications. It offers a wide range of features to secure web applications, including user authentication, role-based access control, and protection against common security threats.
- Usage in E-Voting Application: Spring Security can be employed to safeguard the E-Voting Application, ensuring that only authenticated users can access certain features and protecting sensitive data.



# **E-voting**

## **User Registration:**

- Users can register by providing their name, phone number, password, email ID, Aadhar number, Date of Birth and Photo.
- Thymeleaf templates create user-friendly registration forms, and JPA Repository stores user data in MySQL.

## **User Authentication and Login:**

- The user can log in by providing the registered email ID and password.
- Spring Security ensures secure user authentication during login, protecting against unauthorized access.
- It also distinguishes between users and administrators, granting admin privileges for monitoring and managing the electoral process.

## **Voting Process:**

- Registered users can vote for a candidate from a list of eligible candidates by entering the generated OTP after verifying the user details.
- The system tracks each user's vote status, changing it to "voted" after casting their ballot.

## **Admin Panel:**

- Spring Security roles differentiate between users and administrators.
- Admins can monitor voter activity, view voter records, and manage them by editing, updating, or deleting voter information and also can view admin details

## **Result Publication:**

Admins have the authority to publish election results, which are stored securely in the MySQL database.