

Software Requirements Specification (SRS)

Election Management System

Group - 8

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1. Project Summary

1.1 Project Overview

The Election Management System (EMS) is a full-stack web application designed to digitally manage the electoral process in a constituency. The system provides an integrated platform for managing voter registration, officer verification, candidate details, vote casting, and result declaration. By digitizing these critical aspects of the electoral process, the EMS aims to improve efficiency, accuracy, transparency, and security.

Built using modern technologies such as React.js (frontend), Node.js with Express (backend), PostgreSQL with Sequelize ORM (database interaction), and styled using Bootstrap and Tailwind CSS, this system is responsive, secure, and scalable. It supports multiple user roles—Admin, Officer, and Elector—each with their specific functionalities. Secure authentication is enforced using JSON Web Tokens (JWT), and access to pages and operations is restricted based on user roles. The EMS offers a real-time dashboard for each user, a mobile-friendly UI, and an interactive result display using charts.

1.2 Project Scope

The EMS covers all major aspects of a constituency-level election, including:

- A complete user authentication and authorization system (signup, login, JWT tokens, protected routes).
- Role-based dashboards:
 - Admins can manage polling stations, constituencies, officers, electors, parties, and candidates.
 - Officers can verify electors assigned to their polling station and monitor polling day progress.
 - Electors can view their profile, verify their voting eligibility, cast a vote (only once), and view live results.
- Candidate and party registration handled by the Admin.
- Vote casting interface for electors, with real-time feedback.

- Result visualization with dynamic charts (bar and pie) and vote count announcements.
 - Fully responsive UI for desktop and mobile devices.
 - Backend API endpoints for all CRUD operations.
 - Hosting-ready configurations for deployment to platforms like Vercel (frontend) and Render or Heroku (backend).
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2. General Description

2.1 Product Functions Overview

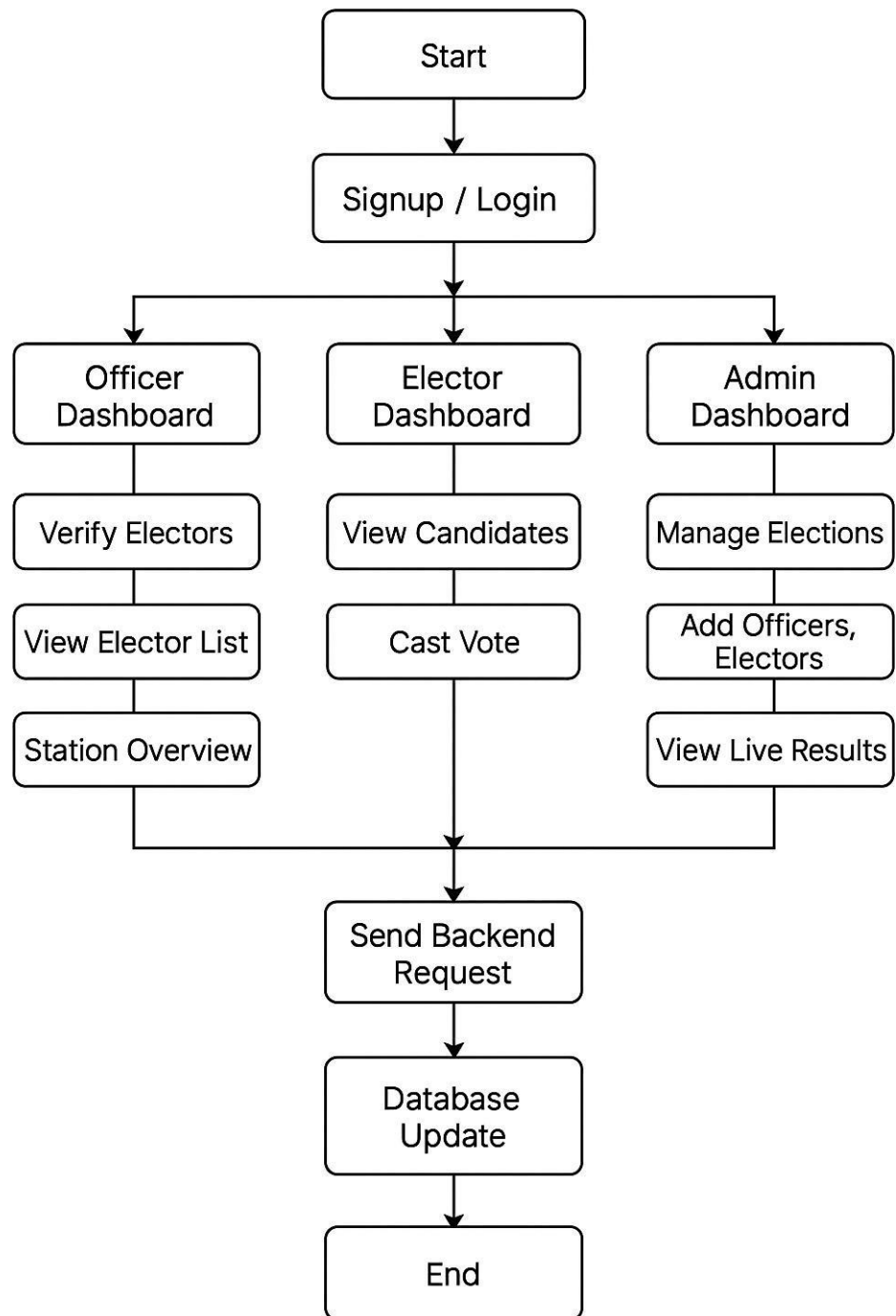
The EMS application supports a wide range of functionalities:

- **User Authentication:** Signup and login for Admin, Officer, and Elector roles. Upon login, a JWT token is issued, and routing is role-specific.
- **Admin Functions:**
 - Add, edit, and delete constituencies and polling stations.
 - Manage political parties and register candidates.
 - Assign officers to polling stations.
 - View live voting results.
- **Officer Functions:**
 - View their assigned polling station and its details (ward, area).
 - Access the list of electors assigned to their station.
 - Verify electors and update verification status.
- **Elector Functions:**
 - View personal profile (name, serial number, polling station).
 - View candidate list for their constituency.
 - Cast a vote securely.
 - Check voting status and result announcement page.

2.2 Types of Users / Actors

- **Admin:** Full access to system management features. Can add/update/delete constituencies, polling stations, officers, parties, candidates, and electors. Also has access to live voting results and winner declaration.
- **Officer:** Assigned to a specific polling station. Responsible for verifying electors, ensuring correct voter data, and monitoring voter activity on polling day.
- **Elector:** Registered voter with access to their profile, the ability to cast one vote, and view results.

2.3 Flowchart



3. Technical Requirements

Backend:

- Node.js with Express.js for building RESTful APIs
- Sequelize ORM for database modeling and interaction
- JWT-based authentication and role-based authorization middleware
- PostgreSQL as the database
- Middleware for CORS and JSON parsing

Frontend:

- React.js for building the user interface
- React Router v6 for client-side routing
- Axios for making API requests, with interceptors for attaching tokens
- React Hooks for component state and lifecycle management
- React Toastify for user notifications and error alerts
- Tailwind CSS and Bootstrap for styling and responsive layout
- Lazy loading for optimizing component rendering and speed

Other Configurations:

- Environment variables for securing API base URLs, JWT secrets, and DB credentials
- Backend migrations for managing database schema
- Vite for frontend build and fast development server

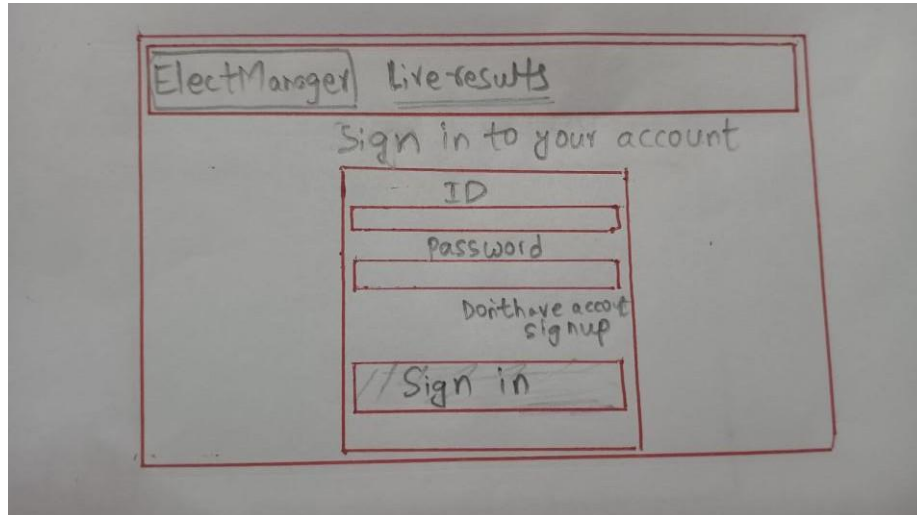
This technology stack supports a robust full-stack JavaScript architecture, offering scalability, performance, and maintainability.



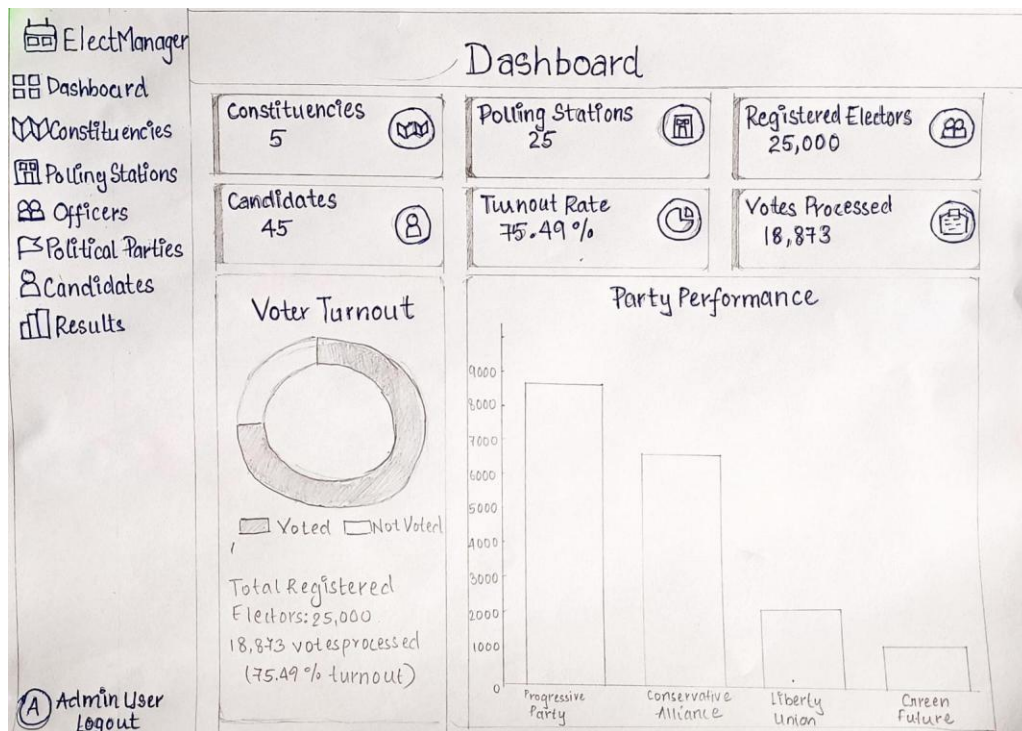
4. User Interface Design

Each page of the EMS follows a clean and modern design:

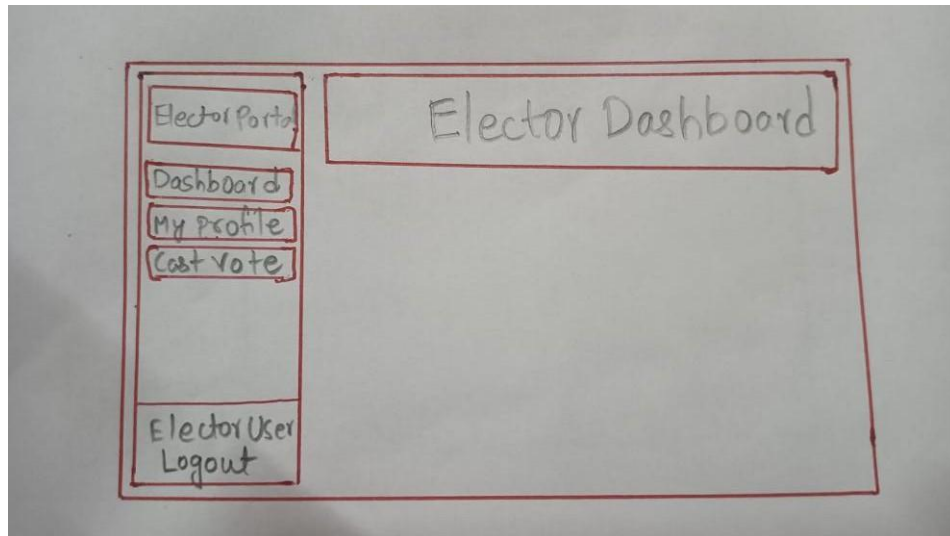
- **Signup/Login Pages:** Minimal design using Bootstrap forms. Role selection in signup. Error handling for invalid input.



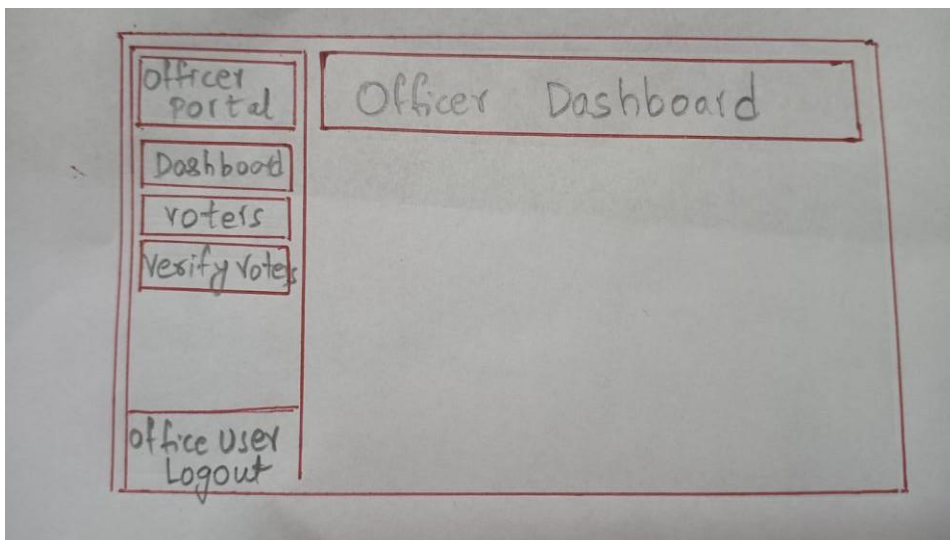
- **Admin Dashboard:** Sidebar layout with cards showing stats. Access to pages for managing entities. Uses modals for CRUD actions.



- **Elector Dashboard:** Shows profile and voting status. Link to voting page



- **Officer Dashboard:** Lists of electors by polling station. Option to mark as verified. Real-time elector status indicators.



- **Voting Page:** Grid layout of candidate cards with names, parties, and party logos. Radio buttons for selection. Submit button disabled until a candidate is selected.
- **Results Page:** Displays vote count in real time using bar and pie charts. Winner highlighted.
- **Navigation:** Role-based top navbar and side drawer for navigation. Logout functionality.
- **Mobile Optimization:** Responsive layout for all devices.



Election Management System

Sign in to access your dashboard

User ID

3

Password

.....

☐ Remember me

[Create account](#)

Sign in

Quick Demo Access

Admin Demo



Full system administration access

Login as Admin

Show Credentials

Officer Demo



Polling station management

Login as Officer

Show Credentials

Voter Demo



Voter dashboard and voting

Login as Voter

Show Credentials

Create Your Account

Join the Election Management System

Username *

Enter your username

Email Address *

Enter your email

Password *

Create a strong password

Select Your Role

System Administrator

Full system access and management

Returning Officer

Election oversight and coordination

Registration Officer

Voter registration management

Polling Officer

Polling station operations

Presiding Officer

Station supervision and compliance

Voter/Elector

Vote and view results

Linked ID (Optional)

Enter linked ID if applicable

Create Account →

Already have an account?

Sign In Instead

ElectManager

Dashboard

Constituencies

Polling Stations

Officers

Political Parties

Candidates

Results

Admin User

Logout

Admin Dashboard

System overview and management center

System Online

Live Updates: 7 votes/min

Online Stations

33/25

Active Officers

84

Live Voting

7/min

Constituencies

5

Polling Stations

25

Registered Electors

25,000

Candidates

45

Turnout Rate

75.49%

Votes Processed

18,873

Voter Turnout

18,873

Total Registered Electors: 25,000
18,873 votes processed (75.49% turnout)

Party Performance

Progressive Party

Conservative Alliance

Liberty Union

Green Future

Progressive Party

Conservative Alliance

Liberty Union

Green Future

Quick Actions

Recent Activity

ElectManager

Dashboard

Constituencies

Polling Stations

Officers

Political Parties

Candidates

Results

Admin User

Logout

ElectManager

Dashboard

Elector Verification

Station Details

Officer User

Polling Station

Logout

Constituencies

Constituencies Management

Manage electoral constituencies and their boundaries

Add Constituency

5 Total Constituencies

29,430 Total Voters

39 Polling Stations

5,886 Avg. Voters/District

Search constituencies by name, code...

Constituency	Voter Information	Infrastructure	Description	Status	Actions
BA Bangalore North	5,064 Voters 145 sq km	10 Stations 506 voters/station	Bangalore North constituency area	Active	Edit Delete
CH Chennai Central	6,527 Voters 244 sq km	7 Stations 932 voters/station	Chennai Central constituency area	Active	Edit Delete
DE Delhi East	3,890 Voters 240 sq km	10 Stations 389 voters/station	Delhi East constituency area	Active	Edit Delete
KO Kolkata South	7,678 Voters 125 sq km	4 Stations 1920 voters/station	Kolkata South constituency area	Active	Edit Delete
MN Mumbai North	6,271 Voters	8 Stations	Mumbai North constituency area	Active	Edit Delete

Election Results Dashboard

Real-time election results and comprehensive analytics

OverviewLive Results

Total Votes Cast

18,915

of 24,318 registered

Voter Turnout

75.86%

Constituencies

5

All reporting complete

Polling Stations

25/25

reporting complete

Current Leading Party

Progressive Party

Closest Race

Eastern District

Party-wise Vote Share

Live Data

Progressive Party

Conservative Alliance

Liberty Union

Green Future

Votes by Party

Export

Progressive Party

Conservative Alliance

Liberty Union

Green Future

Constituency Results

Detailed results for all constituencies

Export All

Officer Dashboard

Welcome back, Demo Officer

Role: polling_officer

Not Assigned

Assigned Station

0

Registered Electors

0

Votes Cast

0%

Voter Turnout

Voter Turnout Progress

Progress: 0 of 0 electors

0%25%50%75%100%

Station Information

Station Name

Not assigned

Ward

N/A

Area

N/A

Officer Role

polling_officer

Quick Actions

Verify Electors

Station Details

View Results

Electror Verification

Station Active

Electror Verification

Verify electors at your assigned polling station

Total Electors

0

Verified

0

Pending

0

Rejected

0

Search Electors

Q Search by name or serial number...

Filter by Status

All Status

Electror List (0 of 0)

No electors found matching your criteria

Verification Guidelines

Verify identity documents before approving any elector

Cross-check name and serial number with official records

Contact supervisor if you encounter any discrepancies

Maintain accurate records of all verification activities

Station Details

Station Active

Polling Station Details

Comprehensive overview of your polling station

Overview

Officers

Statistics

Voter Management

Station ID

1

Capacity

1200

Turnout

0%

Status

Active

Station Information

Station Name

Central Community Center

Address

123 Main St, Springfield

Constituency

Springfield Central

Total Capacity

1200 voters

Electror Dashboard

Not Voted Yet

Welcome, Demo Voter!

Your gateway to democratic participation

Registration Status

Verified

Polling Station

Demo Station

Voting Status

Not Voted

Personal Information

Serial Number

3

Full Name

Demo Voter

Polling Station

Demo Station

Area

Demo Area

Quick Actions

Cast Your Vote

View Results

ElectManager

Dashboard

My Profile

Vote

Results

E

Elect User

Constituency

Logout

ElectManager

Dashboard

My Profile

Vote

Results

E

Elect User

Constituency

Logout

My Profile

Not Voted Yet

D

Demo Voter

Serial Number: 3

Edit Profile

Personal Information

Serial Number

3

Full Name

Demo Voter

Polling Station Details

Station Name

Demo Station

Area

Demo Area

Ward

W-DS1

Station ID

1

Account Settings

Change Password

Download Profile Data

Vote

Not Voted

Cast Your Vote

Select your preferred candidate and exercise your democratic right

Voting Instructions

1

Review all candidates carefully before making your selection

2

Click on the candidate card to select your preferred choice

3

Confirm your selection by clicking "Submit Vote"

4

Your vote cannot be changed once submitted

Select Your Candidate

A

Abhijit Banerjee

All India Trinamool Congress

A

Amit Singh

Aam Aadmi Party

G

Geetha Reddy

Bharatiya Janata Party

K

Kavitha Nair

Aam Aadmi Party

L

Lakshmi Raman

Indian National Congress

M

Mamata Das

Indian National Congress

5. Team Members and Contributions

Team Member Feature Ownership

Member 1	Officer Dashboard, Elector Verification
Member 2	Elector Dashboard, Voting Page
Member 3	Results Visualization, Profile Pages
Member 4	Admin Dashboard, Backend Integration

6. Database Models Overview

Entity	Attributes & Relationships
Constituency	id (PK), name
PollingStation	id (PK), name, area, ward, constituencyId (FK)
Officer	id (PK), name, role (ENUM), pollingStationId (FK)
Elector	id (PK), serialNumber (unique), name, pollingStationId (FK)
Party	id (PK), name, symbol
Candidate	id (PK), name, partyId (FK), constituencyId (FK)
Vote	id (PK), electorId (FK), candidateId (FK), pollingStationId (FK)
