# E – AUTHENTICATION USING OTP AND QR CODE FOR ONLINE VOTING SYSTEM

## A PROJECT REPORT

*Submitted by*

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*in partial fulfilment for the award of the degree*

*of*

## BACHELOR OF ENGINEERING

*in*

## COMPUTER SCIENCE AND ENGINEERING



## SARANATHAN COLLEGE OF ENGINEERING

**(An Autonomous Institution; Affiliated to Anna University, Chennai – 600 025)**



## ANNA UNIVERSITY CHENNAI - 600 025

**MAY 2025**

# SARANATHAN COLLEGE OF ENGINEERING

**(An Autonomous Institution; Affiliated to Anna University, Chennai – 600 025)**

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## BONAFIDE CERTIFICATE

Certified that this project report **"E–AUTHENTICATION USING OTP AND QR CODE FOR ONLINE VOTING SYSTEM"** is the bonafide work of **"PRADEEP KUMAR M(813821104070),PRAGADEESHWARAN S(813821104071),RANJITH M(813821104307),VIGNESH K (813821104308)"**, who carried out the project work under my supervision.


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# ACKNOWLEDGEMENT

"Thanks" may be a little word, but its cloquence is magnified only when it is spelled from the depth of the heart. At this point of time, we would like to extend our heartfelt thanks to all those who helped us throughout this major assignment.

First of all we would like to thank the "Almighty" for having given us the "Will and Determination" to pursue our goal tenaciously.

We wish to thank our college Secretary **Shri. S. Ravindran** and our Principal

**Dr. D. Valavan M.Tech., Ph.D.** for their support in completing the project work successfully.

With extreme sense of gratitude, we express our sincere thanks to our Head of the Department of Computer Science and Engineering, **Dr. V. Punitha M.E., Ph.D.** for the encouragement in completing the work successfully.

We express our sincere thanks to our project guide **Ms. G Sathya, M.E.** and project coordinator **Ms. J. Sathia Parkavi, M.E.** and project review committee members and all the faculty members of the department of Computer Science and Engineering for giving valuable guidance, immense help and encouragement throughout out project work.

We owe our most genuine thanks to our beloved parents, siblings and friends for their continuous support.

# ABSTRACT

Online voting systems require robust security mechanisms to ensure voter authenticity and prevent election fraud. This project, E-Authentication using OTP and QR for Online Voting System, aims to enhance election security by integrating email verification, QR code authentication, and OTP-based login to authenticate voters. The system is designed using PHP with MySQL for database connectivity, ensuring seamless data management and secure voter registration. To generate and verify QR codes, the MD5 hashing algorithm is implemented, providing a unique, tamper-resistant identity for each voter. The PHPMailer dependency is utilized to send email OTPs and QR codes, ensuring that only legitimate voters gain access. The system prevents multiple voting attempts by marking the voting status in the database. Each voter can only cast their vote once, ensuring fair election procedures. The admin module facilitates election officials in managing political parties, monitoring voter activity, and securing election data. The system provides a user-friendly web interface for voters, enabling them to authenticate and cast their votes effortlessly. Additionally, the system implements session management and encryption techniques to protect voter data from unauthorized access. By integrating multi-layered authentication, this system ensures reliability, accessibility, and transparency in the electoral process. The combination of PHP, MySQL, QR code-based verification, OTP authentication, and secure email communication creates a robust and fraud-resistant online voting platform suitable for modern democratic elections.

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# CHAPTER 1
# INTRODUCTION

The objective of this project is to design and implement a secure and efficient E-authentication system using OTP and QR-based verification for online voting. The system aims to enhance the integrity, transparency, and accessibility of the voting process through several key features. Firstly, the platform will incorporate One-Time Password (OTP) authentication, ensuring that only registered voters can access the system. This method adds an extra layer of security by verifying the voter's identity via their registered email before allowing them to cast a vote. Secondly, the system will implement QR code-based authentication, enabling voters to securely verify their identity by scanning a unique QR code to cast their vote. This approach helps in preventing unauthorized access and ensures a seamless authentication process for voters. Thirdly, the platform will provide a user-friendly voting interface, allowing voters to choose from five political parties and securely submit their vote. The voting status of each user will be stored in a MySQL database, preventing multiple votes from the same user and maintaining data integrity. By integrating PHP and MySQL, the system will ensure secure data handling, real-time vote updates, and robust authentication mechanisms, ultimately providing a reliable and fraud-resistant online voting solution.

## 1.1 Purpose

The purpose of this project is to design and implement a secure and efficient E-authentication system for an Online Voting Platform using One-Time Passwords (OTP) and QR codes. In the digital age, ensuring the authenticity of voters and the integrity of the voting process is paramount. Traditional voting systems are often susceptible to impersonation, fraud, and unauthorized access. This project aims to eliminate such vulnerabilities by integrating multi-factor

authentication mechanisms that verify the identity of users before granting access to vote. The proposed system not only enhances security but also promotes transparency and trust in online elections, making it highly suitable for universities, organizations, and potentially large-scale governmental use with further development.

## 1.2 Scope

The scope of this project is to develop a secure, scalable, and user-friendly online voting system that leverages multi-factor authentication (MFA) using OTP and QR code verification to ensure voter identity and integrity of the voting process.

This project covers the following key functionalities:

- User Registration with secure storage of voter details and credentials in a database.

- Multi-factor Authentication during login and voting, including:

    o OTP verification sent to the registered email.

    o QR code generation using MD5 hash of user-specific data (username, email, voter ID).

- QR Code-based One-Time Voting, ensuring each user can vote only once using a uniquely generated code.

- Vote Casting Interface for selecting party/candidate options and submitting votes.

- Vote Tracking and Storage in a secure MySQL database.

- Capture images via webcam after multiple failed attempts.

- Send alert emails with captured images to the rightful user.

**1.3 Existing System**

In India, the traditional voting system requires voters to physically visit polling stations to cast their votes. This process involves manual verification of voter identity using electoral rolls and identification documents. While this method has been effective, it presents several challenges, including long queues, logistical issues, and accessibility concerns for elderly and disabled voters. Additionally, manual vote counting is time-consuming and prone to human errors. Security concerns such as booth capturing, voter impersonation, and tampering with physical ballots also pose significant risks. The lack of a remote or digital voting mechanism restricts participation for citizens who are unable to visit polling stations due to health issues, work commitments, or being away from their registered constituency. These limitations highlight the need for a secure, efficient, and technology-driven voting system that ensures transparency, accessibility, and fraud prevention.

**1.3.1 Drawbacks of Existing System**

1. Voters must physically visit polling stations, causing inconvenience.

2. Long queues and manual verification lead to delays.

3. Risk of electoral fraud, such as voter impersonation and booth capturing.

4. Limited accessibility for elderly, disabled, or outstation voters.

5. Manual vote counting increases the chances of human errors.

**1.4 Proposed System**

The E-Authentication using OTP and QR for Online Voting System introduces a secure and technology-driven approach to online voting, eliminating the need for physical polling stations. This system enhances voter authentication by implementing multi-factor authentication during registration, combining OTP verification and QR code generation for secure identity validation. Unlike traditional voting methods, where impersonation and duplicate voting are concerns, this system ensures that each voter can cast their vote only once using a one-time usable QR code. The proposed system allows users to log in using an OTP sent to their registered email, ensuring only authorized voters gain access. During the voting process, voters select one of five political parties and must authenticate their vote by scanning the unique QR code assigned to them. Once used, the QR code expires, preventing multiple votes from the same user. The backend, developed using PHP and MySQL, securely manages voter data and vote tracking, ensuring transparency and integrity in the election process.

By integrating QR-based authentication, OTP verification, and secure database management, this system provides a tamper-proof, accessible, and efficient solution for online voting, reducing electoral fraud and enhancing voter participation.

**1.3.1 Advantages of Proposed System**

1. **Enhanced Security** – Multi-factor authentication using OTP and one-time QR code prevents unauthorized voting.

2. **Prevention of Duplicate Voting** – Each voter can cast their vote only once using a single-use QR code.

3. **Remote Accessibility** – Voters can securely participate in elections from anywhere, eliminating the need to visit polling stations.

# CHAPTER 2

# LITERATURE SURVEY

**2.1 Enhancing Digital Security: A QR Code and OTP-Based E-Authentication System**

Author: Mohammed Awad Mohammed Ataelfadiel

Year: 2023

**Abstract:** This study proposes an innovative approach to user authentication by integrating QR codes and One-Time Passwords (OTP) to enhance digital security. The system employs two-factor authentication (2FA) to protect against unauthorized access, utilizing QR codes for secure information storage and OTPs for dynamic verification. The methodology aims to increase the complexity of password cracking and encourages the use of intricate passwords,

**Advantages:**

- Enhanced security through two-factor authentication.

- Secure storage of information using QR codes.

- Increased complexity in password cracking, promoting stronger password usage.

**Limitations:**

- Potential usability challenges due to the complexity of the authentication process.

- Dependence on users' devices to support QR code scanning and OTP reception.

## 2.2 Smart Online Voting System

Authors: S Ganesh Prabhu, A Nizarahammed., S Prabu., S Raghul.,

 R.R. Thirrunavukkarasu, P. Jayarajan

Year : 2021

**Abstract :** Our country, India is the largest democratic country in the world. So it is essential to make sure that the governing body is elected through a fair election. India has only offline voting system which is not effective and upto the mark as it requires large man force and it also requires more time to process and publish the results. Therefore, to be made effective, the system needs a change, which overcomes these disadvantages. The new method does not force the person's physical appearance to vote, which makes the things easier. This paper focusses on a system where the user can vote remotely from anywhere using his/her computer or mobile phone and doesn't require the voter to got to the polling station through two step authentication of face recognition and OTP system. This project also allows the user to vote offline as well if he/she feels that is comfortable. The face scanning system is used to record the voters face prior to the election and is useful at the time of voting. The offline voting system is improvised with the help of RFID tags instead of voter id. This system also enables the user the citizens to see the results anytime which can avoid situations that pave way to vote tampering.

**Advantages:**

1. Remote Voting Access – Voters can cast their votes from anywhere using a computer or mobile phone, eliminating the need for physical presence at polling stations.

2. Enhanced Security – Two-step authentication using face recognition and OTP ensures only authorized voters can participate, reducing impersonation risks.

3. Time Efficiency – Digital voting speeds up the process, minimizing manual work and allowing faster result publication.

4. Dual Voting Options – Offers both online and offline voting, catering to different voter preferences and increasing accessibility.

5. Improved Offline Voting – Replaces traditional voter ID with RFID tags for a more efficient and tamper-proof offline voting process.

6. Transparency – Citizens can view real-time results, reducing possibilities of vote tampering and increasing trust in the system.

**Limitations:**

1. Technology Dependency – Requires voters to have access to smartphones or computers, which may exclude certain demographics.

2. Face Recognition Challenges – Accuracy may be affected by lighting conditions, facial changes, or technical errors.

3. Security Concerns – Online systems are vulnerable to cyber threats, hacking, or data breaches.

4. Infrastructure Requirements – Requires a robust backend system and reliable internet connectivity for seamless voting and result tracking.

5. Voter Authentication Issues – False positives or negatives in face recognition could lead to authentication errors.

6. Adoption Resistance – Some citizens may be reluctant to shift from traditional voting methods due to lack of trust or familiarity with digital systems.

## 2.3 Enhancing Security in Online Voting Systems: A Cryptographic Approach Utilizing Galois Fields

Authors: Chittibabu Kandikatla, Sravani Jayanti, Pragathi Chaganti, Hari Kishore Rayapoodi, Chandra Sekhar Akkapeddi

Year: 2024

**Abstract:** This research introduces a cryptographic method leveraging Galois Fields to enhance the security of online voting systems. By applying advanced mathematical frameworks, the proposed system ensures data integrity and confidentiality during electronic voting processes. The approach addresses common vulnerabilities in online voting by implementing robust encryption techniques.

**Advantages:**

1. **Enhanced Security** – The use of cryptographic methods with Galois Fields strengthens data encryption, making it harder for unauthorized entities to manipulate votes.

2. **Confidentiality** – Protects voter information and voting choices from being exposed to unauthorized parties.

**Limitations:**

1. **Computational Complexity** – Advanced cryptographic techniques require significant processing power, potentially slowing down the voting system.

2. **Implementation Challenges** – Requires expertise in cryptography and secure system design, making deployment more complex.

3. **Scalability Concerns** – Handling a large number of votes with complex encryption methods may increase system latency.

**2.4 Online Voting System Using Face Recognition and OTP**

Authors: Srushti Gunthe, Akanksha Pimpude, Kajol Rathod, Prajwal Zaware
Year:2023

**Abstract:** This project aims to develop an efficient and secure online voting system by integrating face recognition technology and OTP authentication. Utilizing Python and libraries such as OpenCV and NumPy, the system employs the Haar Cascade Algorithm for face detection and recognition. The combination of biometric verification and OTP ensures a high level of security and accessibility, allowing voters to participate remotely without compromising .

**Advantages:**

- Increased security through biometric verification and OTP authentication.

- Enhanced accessibility for voters unable to attend physical polling stations.

**Limitations:**

- Potential issues with face recognition accuracy under varying lighting conditions.

- Requirement for users to have devices equipped with cameras for face recognition.

**2.5 A Secure Online Voting System Using Biometric Authentication**

Authors:R.P.Jain,P.M.Potdar

*Year:*2019

**Abstract:** This paper presents a secure online voting system that incorporates biometric authentication to ensure voter identity verification. The system utilizes fingerprint recognition as a means of authentication, providing a unique and tamper-proof method for voter identification. By integrating biometric data, the system aims to prevent fraudulent activities such as voter impersonation and multiple voting, thereby enhancing the overall security and integrity of the electoral

**Advantages:**

- Enhanced security through unique biometric identifiers.
- Prevention of voter impersonation and multiple voting.

**Limitations:**

- Requirement for biometric hardware, increasing implementation costs.
- Potential privacy concerns related to the storage and handling of biometric data.

# CHAPTER 3
# PROBLEM DEFINITION

Ensuring a secure and transparent voting process is crucial in any democratic system. However, traditional voting methods often face challenges such as logistical inefficiencies, high costs, and security risks, including voter fraud and unauthorized access. With the rise of digital transformation, online voting systems have been explored as a viable alternative, but they come with their own set of vulnerabilities, including authentication failures, multiple voting attempts, and data breaches.Existing online voting systems often lack robust security measures, making them susceptible to cyber threats such as QR code duplication, OTP interception, and database manipulation. Additionally, many platforms struggle with performance issues, including high server loads and slow response times during peak voting periods. Moreover, ensuring voter anonymity while maintaining vote integrity remains a significant challenge, raising concerns about data protection and compliance with legal regulations.

To address these challenges, the E-authentication using OTP and QR for Online Voting System proposes a secure and efficient voting mechanism that integrates multi-factor authentication (OTP + QR Code) to verify voter identity while preventing unauthorized access and multiple voting attempts. By leveraging PHP, MySQL, HTML, CSS, and JavaScript, the system ensures a seamless voting experience while maintaining the security and integrity of the election process. The solution also incorporates one-time usable QR codes, secure database encryption, and optimized performance to handle large-scale elections efficiently.

This system aims to provide a transparent, reliable, and scalable e-voting platform that upholds democratic values by ensuring fairness, security, and accessibility for all voters.

# CHAPTER 4
# E-VOTING SYSTEM DESIGN

## 4.1 SYSTEM ARCHITECTURE

It offers a secure and transparent digital voting platform that ensures voter authentication, prevents fraud, and maintains the integrity of the election process. By integrating multi-factor authentication (OTP + QR Code), the system ensures that only eligible voters can participate, eliminating risks such as multiple voting, unauthorized access, and vote manipulation.

The system comprises the following key components:

- User Registration & Authentication Module: Implements multi-factor authentication using OTP verification and a one-time usable QR code, ensuring secure voter identity validation.

- QR Code Generation & Management: Generates a unique, one-time QR code using MD5 hashing based on voter details (username, email, and voter ID) to prevent duplication and unauthorized use.

- Voting Interface & Security Layer: Provides a user-friendly voting portal where registered voters can securely cast their votes while preventing multiple submissions using database tracking.

- Database Management System: Uses MySQL for securely storing voter credentials, authentication logs, and vote records, ensuring data integrity and confidentiality.

- OTP Delivery System: Implements PHP-based OTP generation and delivery through email for secure login and vote confirmation.

- Vote Tracking & Audit Mechanism: Ensures vote transparency by logging voter status while keeping ballot choices anonymous, maintaining election integrity and compliance.
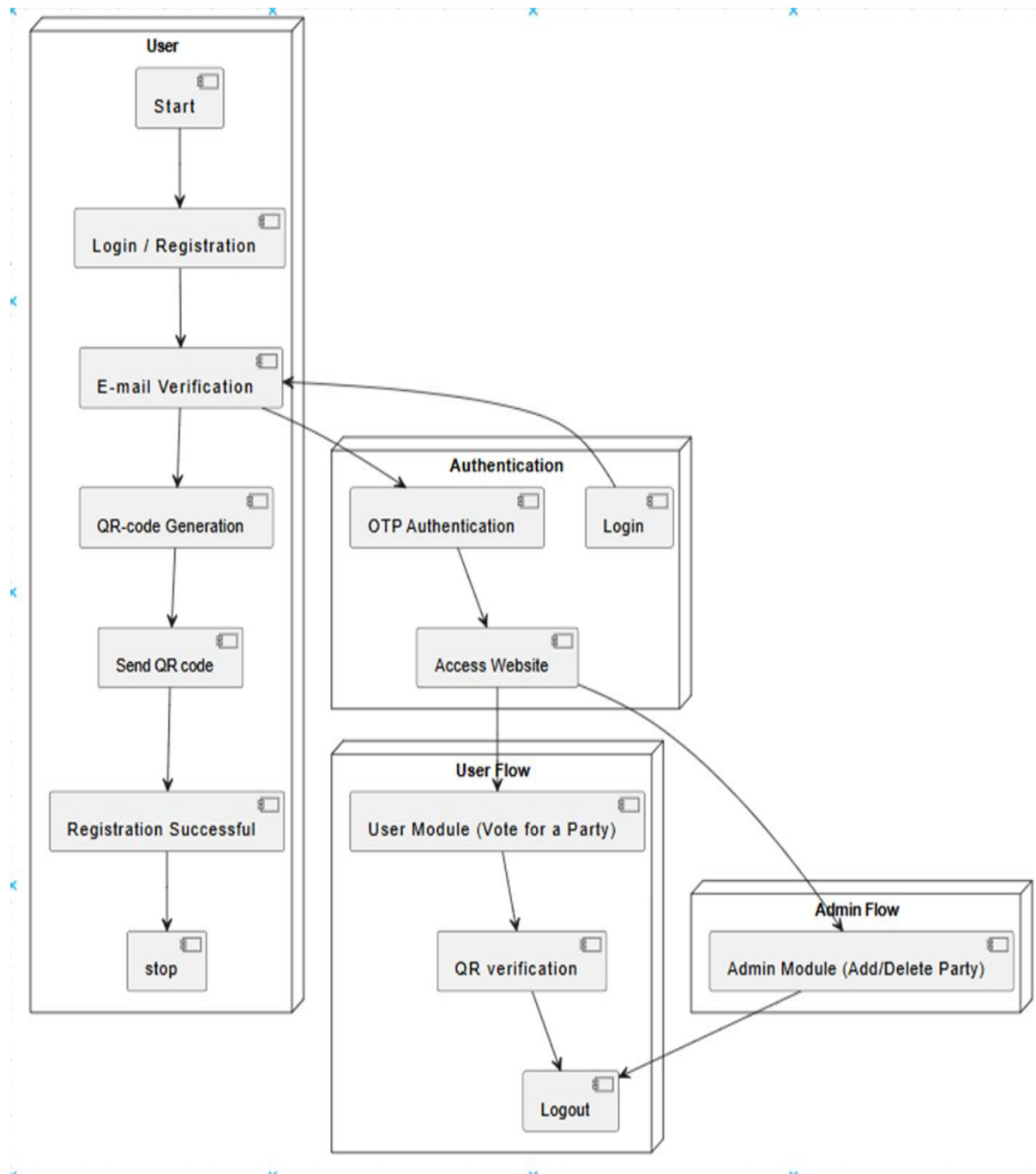
## 4.1.1 SYSTEM ARCHITECTURE DIAGRAM



**Fig. 4.1 System Architecture Diagram**

## 4.2 UML DIAGRAM
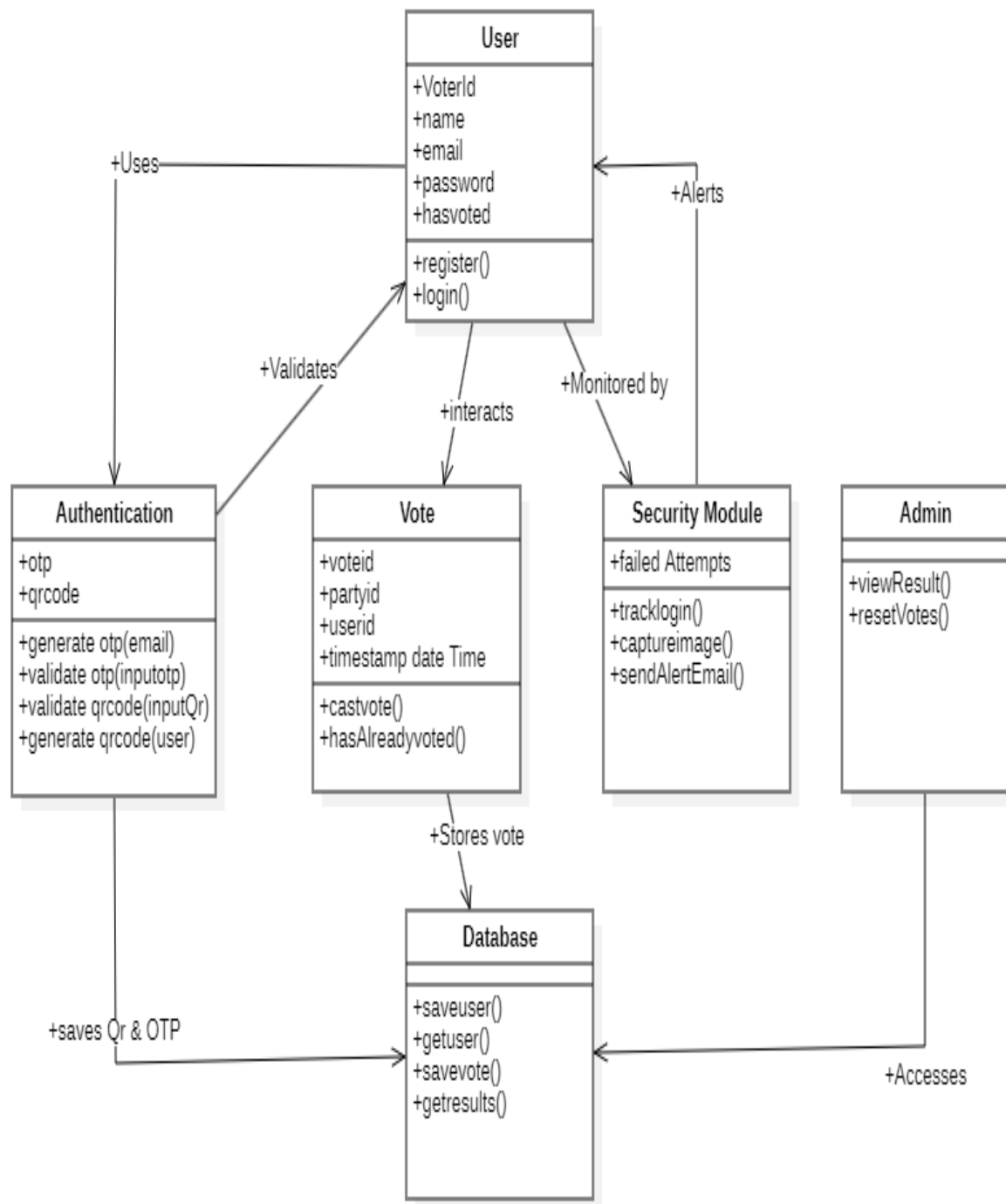
## 4.2.1 CLASS DIAGRAM
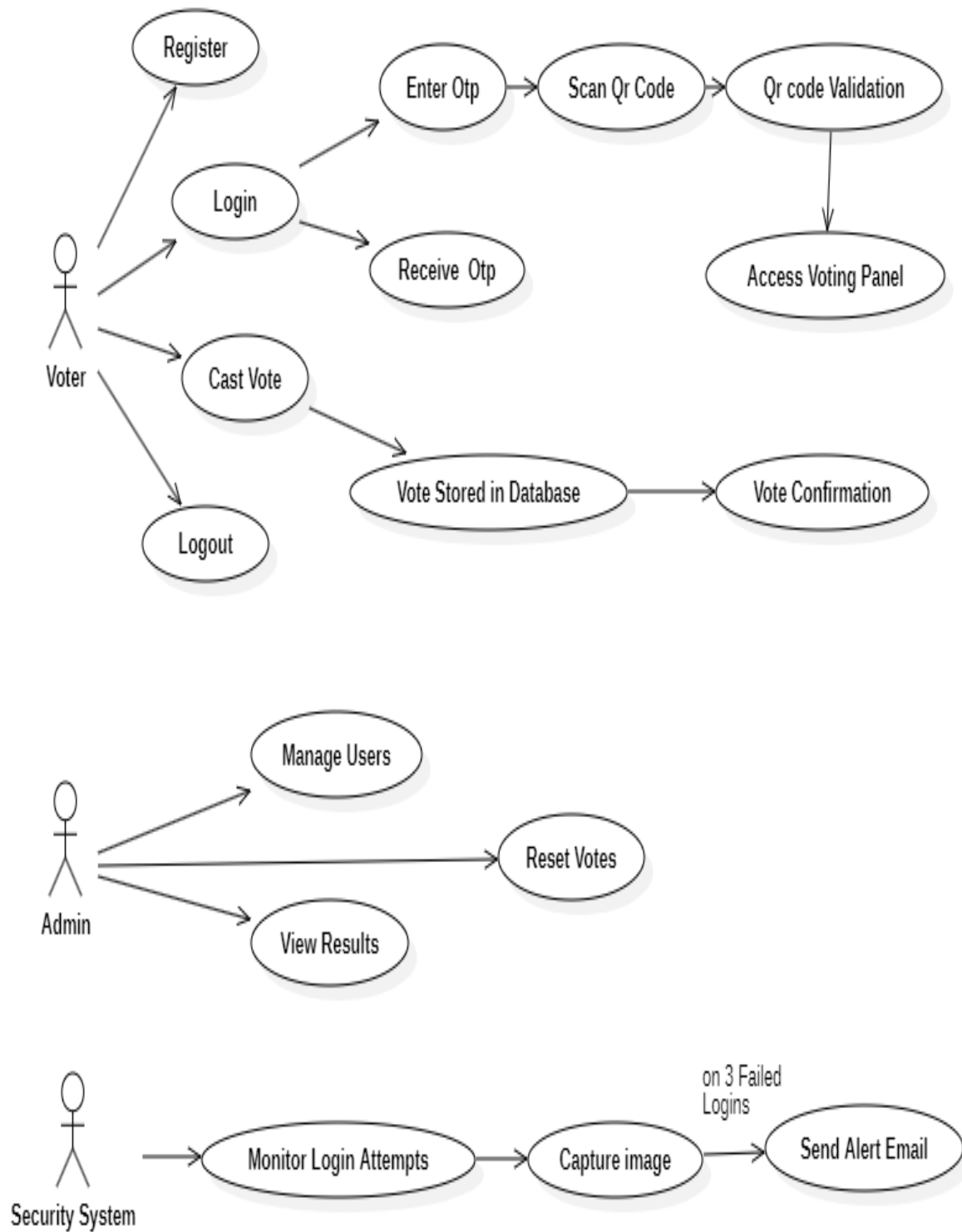


**Fig. 4.2.1 Class Diagram**

**4.2.2 USECASE DIAGRAM**



**Fig. 4.2.2 UseCase Diagram**
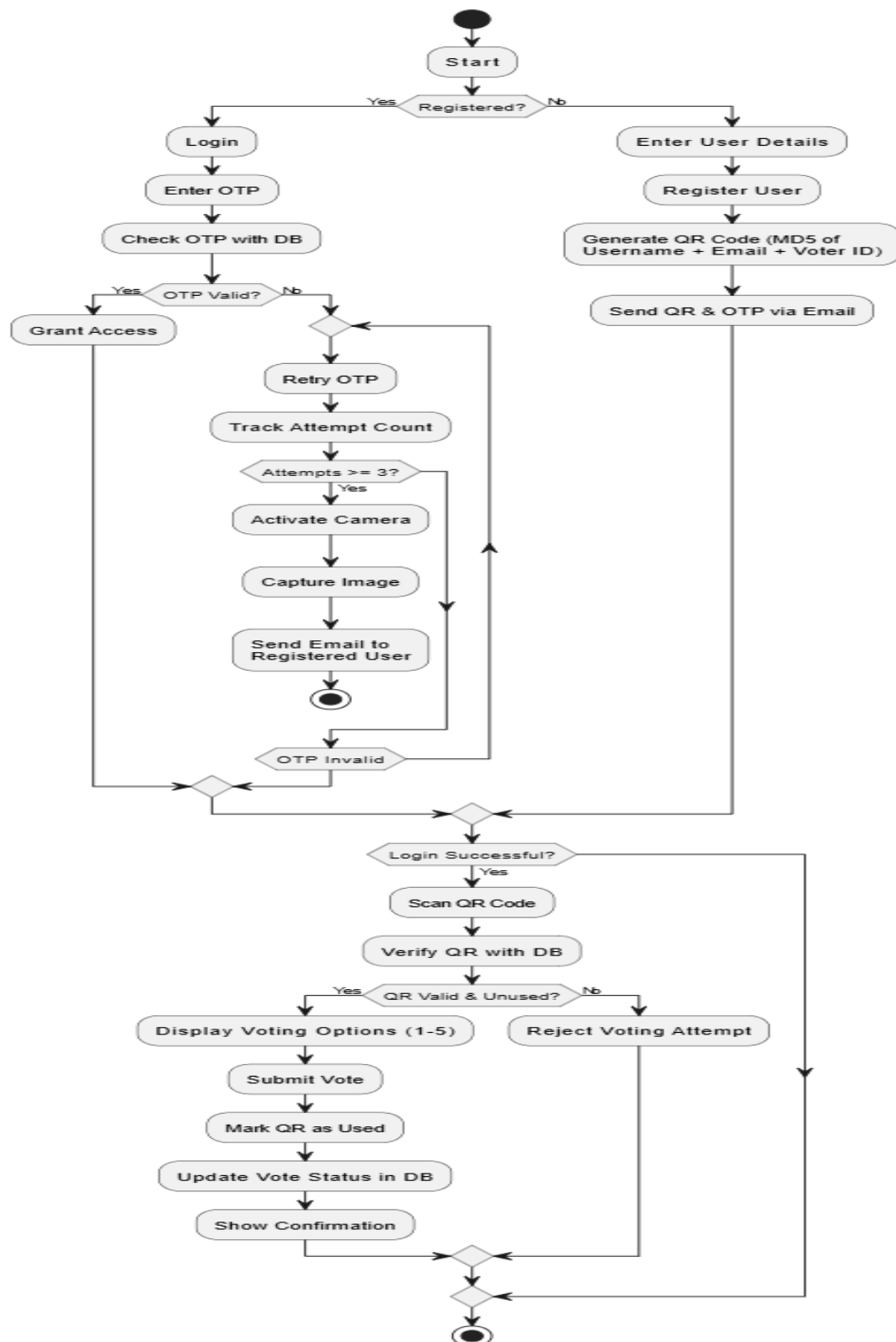
## 4.2.3 ACTIVITY DIAGRAM



**Fig. 4.2.3 Activity Diagram**
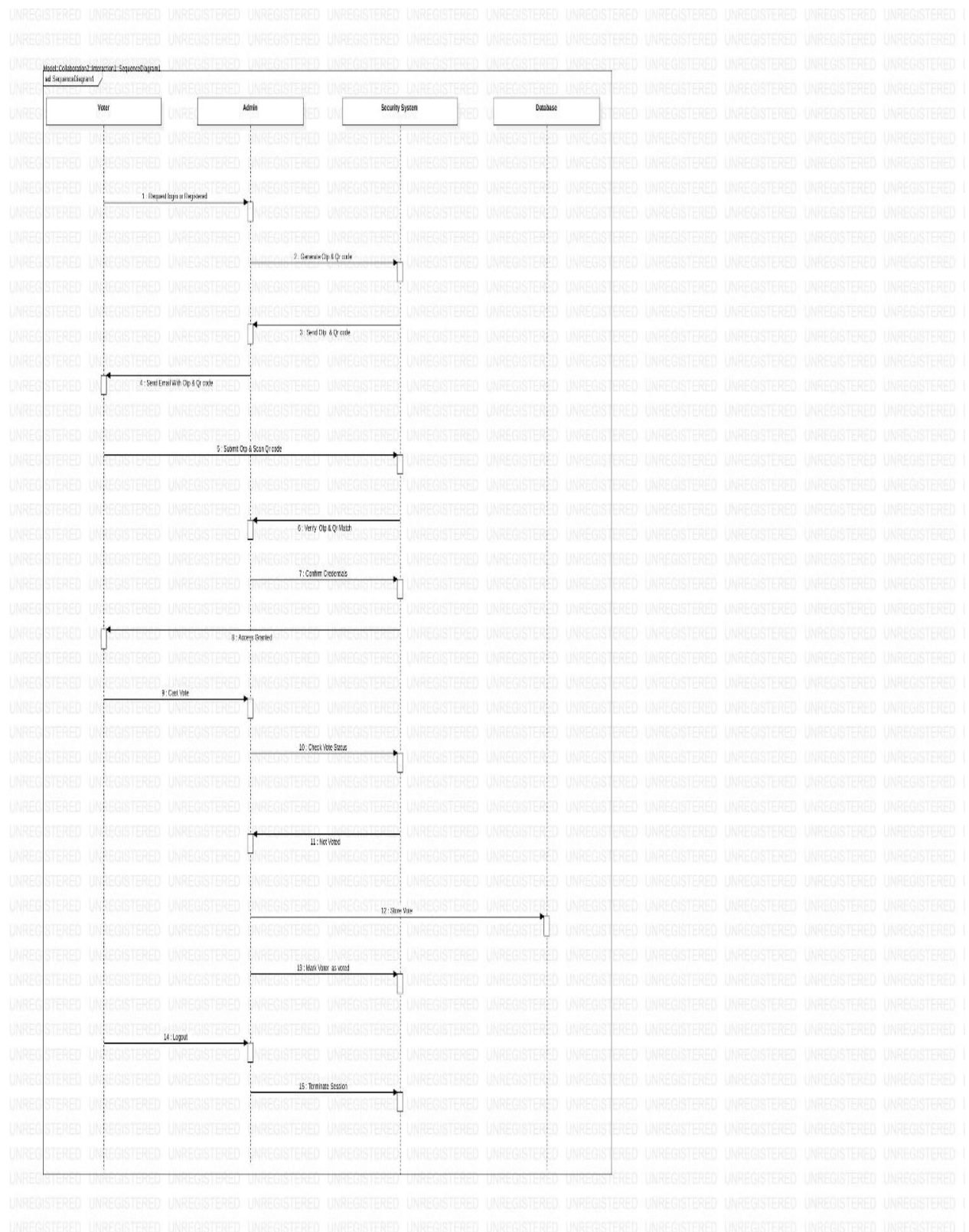
## 4.2.4 SEQUENCE DIAGRAM



**Fig. 4.2.5 Sequence Diagram**

## 4.3 REGISTRATION MODULE

The Registration Module ensures a secure user onboarding process through multiple verification steps. The registration process begins with the user providing their details, such as name, email, and unique voter ID. These details are sent to the server for processing and validation. Next, an email verification step is triggered, where the system generates and sends a One-Time Password (OTP) to the registered email. The user must enter this OTP to confirm their identity. Once verified, the system generates a unique QR code using MD5 encryption, which contains encoded user credentials for secure authentication. The generated QR code is then sent to the user's email for future use in login authentication. Upon successful completion of all these steps, the registration process is marked as successful, and the user is officially registered in the system. This multi-layered approach enhances security, preventing unauthorized access and ensuring that only verified users can participate in the voting process.
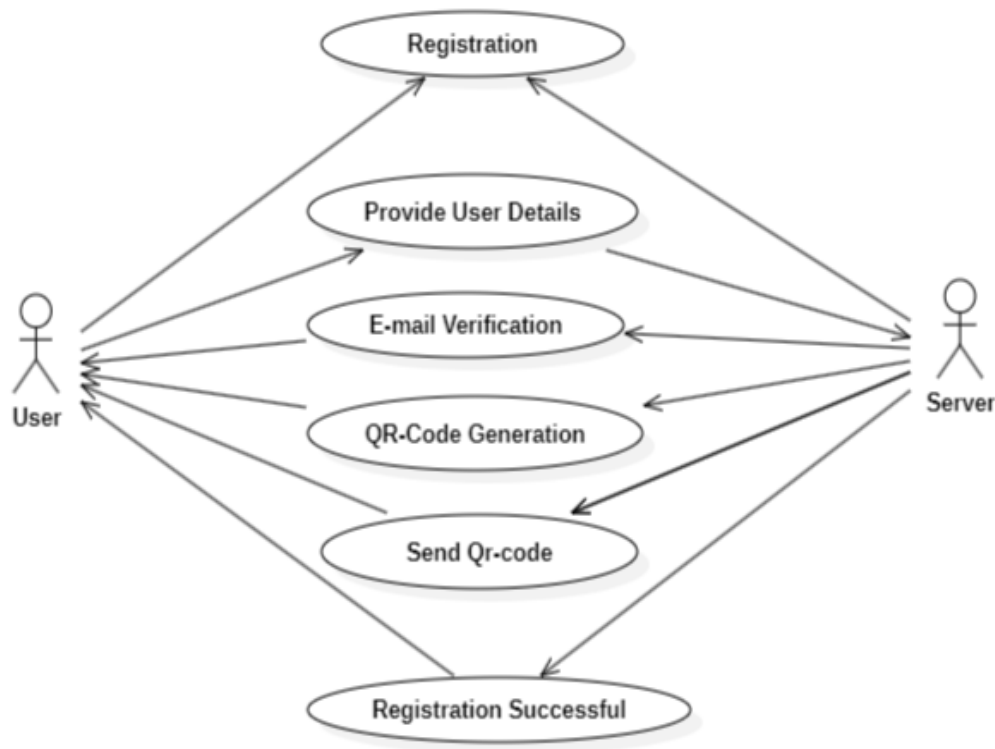


Fig.4.3 Registration Module

## 4.4 LOGIN MODULE

The Login Module ensures secure user authentication through a multi-step process. The login begins with the user entering their Email ID and Password, which are validated as part of the Credential Check process. The server verifies these credentials against the stored user database. If the credentials are correct, the system proceeds to OTP Authentication, where a One-Time Password (OTP) is sent to the user's registered email or phone. The user must enter the OTP to complete the authentication process. Once successfully verified, the user gains access to the website and its functionalities. This dual-layer security approach, combining password authentication with OTP verification, enhances security and prevents unauthorized access.
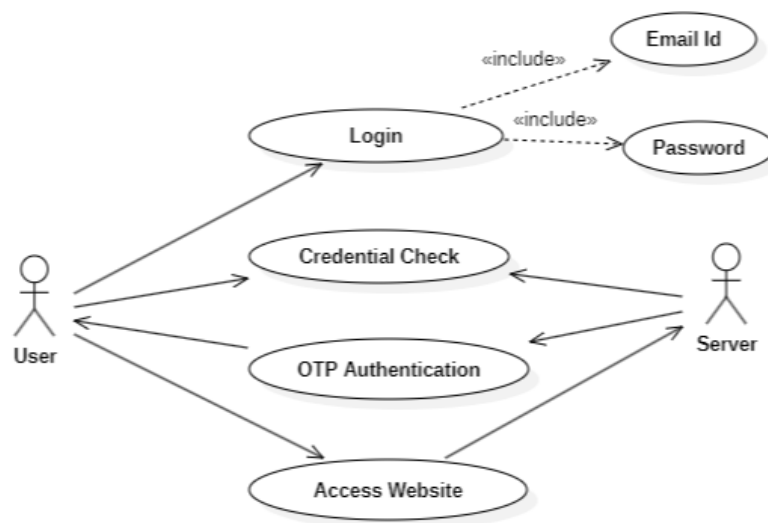


Fig.4.4 Login Module

## 4.5 VOTE CASTING MODULE

The Vote Casting Module in the E-Authentication using OTP and QR for Online Voting System ensures secure and authenticated voting using QR-based verification and a one-time voting mechanism. The process begins when the voter scans their unique QR code, which was generated and provided during registration. Once scanned, the system verifies the QR code's authenticity using MD5 encryption and checks whether it has been used before. If valid, the system displays the list of political parties retrieved from the database. The user selects their preferred candidate, and the system processes the one-time voting action, ensuring that a vote can be cast only once per registered user. After voting, the system stores the vote securely in a MySQL database, marking the QR code as expired to prevent reuse. The final step is displaying the vote confirmation message, assuring the voter that their vote has been successfully recorded. This module integrates multi-factor authentication, encrypted QR-based validation, and real-time vote tracking, enhancing election security and preventing fraudulent voting.
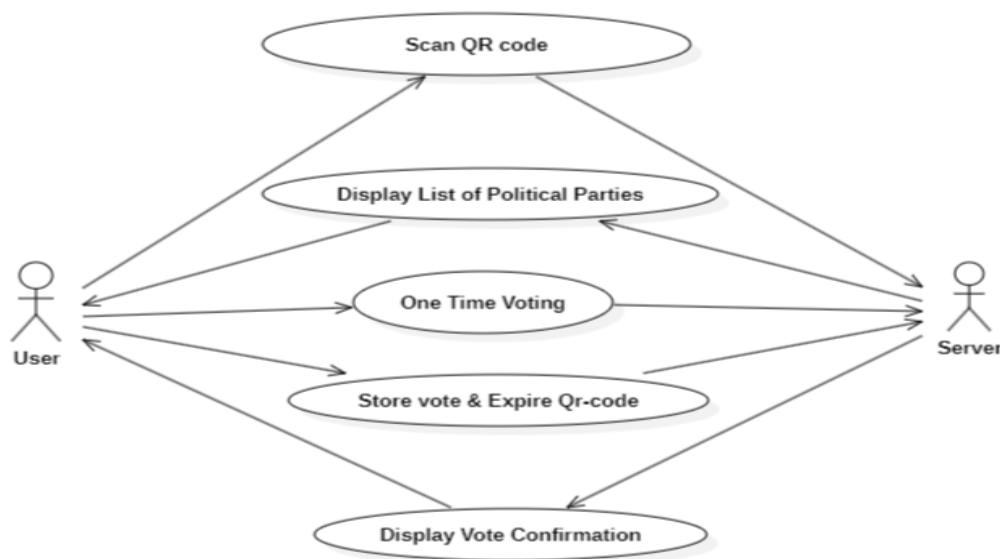


Fig.4.5 Vote Casting  Module

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## 4.6 ADMIN MODULE

The Admin Module in the E-Authentication using OTP and QR for Online Voting System is responsible for managing election-related functionalities, ensuring security, monitoring voting activities, and generating reports. The Candidate Management system allows the admin to add new political parties and delete existing ones, ensuring that the list of candidates remains updated. The Voting Monitoring feature provides real-time tracking of the voting process, ensuring transparency and identifying any anomalies. The Security & Integrity module enforces authentication checks, prevents unauthorized access, and ensures the integrity of the stored votes using encryption and validation mechanisms. Finally, the Report Generation module compiles detailed insights, including voter turnout, election results, and voting trends, providing the admin with essential data for decision-making. This module plays a crucial role in maintaining a fair, transparent, and tamper-proof voting environment.
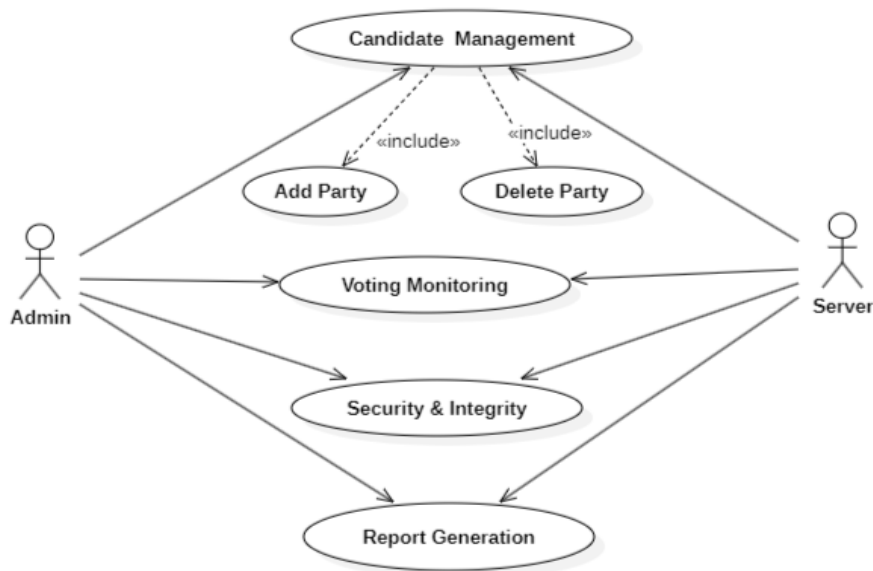


Fig.4.6 Admin Module

## 4.7 INTRUDER CAPTURE & ALERT SYSTEM (ICAS) MODULE

This Intruder Capture & Alert System (ICAS) Module is designed to detect and prevent unauthorized access attempts in the E-Authentication using OTP and QR for Online Voting System. When a user attempts to log in, the system first verifies their credentials against stored data. If the login fails, the system tracks failed attempts, and upon the third consecutive failure, it activates the device camera to capture an image of the intruder. The captured image is then processed, and an alert email is sent to the registered account owner, notifying them of a potential security breach. This module ensures enhanced security by detecting unauthorized users and providing real-time alerts to protect the integrity of the voting system.
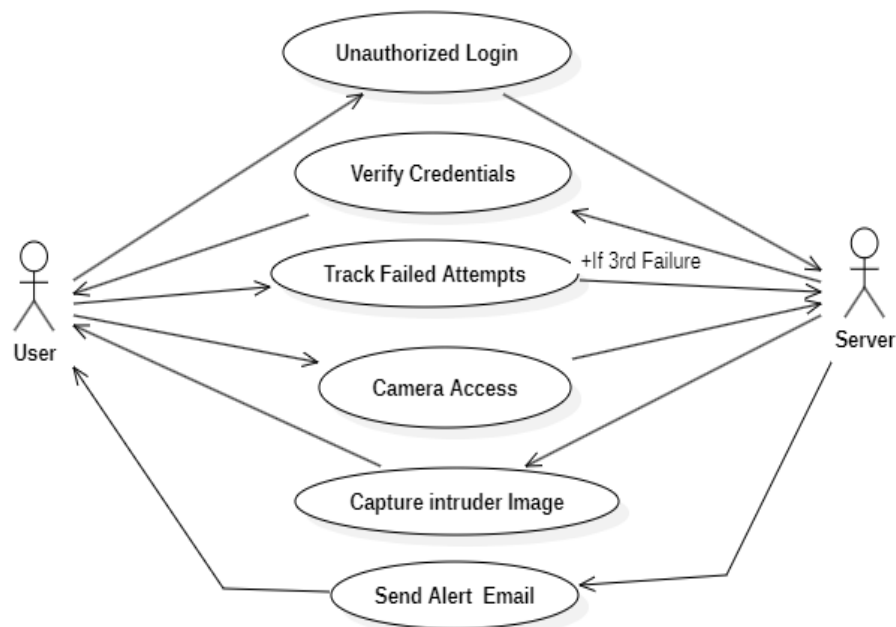


Fig.4.7 Intruder Capture & Alert System (ICAS) Module

# CHAPTER 5

# SYSTEM REQUIREMENTS

## 5.1 HARDWARE REQUIREMENTS

- Process CPU – 8 Core Intel I5 or Ryzen 7 CPU.

- Hard Disk Capacity – 50 GB SSD.

- RAM – 8 GB of RAM.

- 5Mbps of Network Bandwidth.

- Browser Support to Access the Website.

## 5.2 SOFTWARE REQUIREMENTS

**Frontend Requirements:**

- HTML, CSS, JavaScript – For user interface design and responsiveness.

**Backend Requirements:**

- PHP – For server-side logic, authentication, OTP generation, and QRcode.
- MySQL – For storing user details, authentication logs, and voting records.

**Authentication & Security Requirements:**

- OTP Generation & Verification – Using PHP for secure login and registration.
- MD5 Algorithm for QR Code – Encrypting voter details for secure authentication.
- Camera Access API – To capture intruder images after multiple failed login attempts.
- Email SMTP Server – To send OTPs and security alerts.
- HTTPS Protocol – To ensure encrypted communication.

**Other Tools & Platforms:**

- XAMPP/WAMP – For local PHP and MySQL server setup.

- phpMyAdmin – For database management.

- VS Code/Sublime Text – For code editing and development.

# CHAPTER 6
# SYSTEM IMPLEMENTATION

## 6.1 PROPOSED SYSTEM

The E-Authentication Using OTP and QR for Online Voting System is designed to provide a secure, transparent, and efficient voting process. The system eliminates the risks of unauthorized access and fraudulent voting by implementing multi-factor authentication (OTP + QR Code). Users must first register by verifying their identity via OTP authentication and QR code generation based on encrypted voter details. During login, OTP authentication ensures secure access, while voting is enabled through a one-time-use QR code, preventing duplicate votes. Additionally, an advanced security module tracks unauthorized login attempts—capturing intruder images and sending alerts via email upon multiple failed attempts. This system enhances the reliability and security of online voting, ensuring a tamper-proof electoral process.

## 6.2 COMPONENTS USED

The system is developed using a combination of frontend, backend, database, and security technologies to ensure seamless and secure functionality:

1. HTML, CSS, JavaScript – For designing the user interface and enhancing interactivity.

2. PHP – Used for backend logic, database connectivity, OTP generation, and QR code creation.

3. MySQL – A relational database for storing user information, voter credentials, and vote records.

4. MD5 Algorithm – Used to generate encrypted QR codes for voter authentication.

5. PHP QR Code Library – Generates QR codes dynamically for voting authentication.

6. Camera Access API – Captures intruder images upon multiple failed login attempts.

7. SMTP (Simple Mail Transfer Protocol) Server – Used for sending OTPs and security alert emails.

8. XAMPP/WAMP – A local server environment for developing and testing PHP and MySQL-based applications.

## 6.3 PHASES OF IMPLEMENTATION

The E-Authentication Using OTP and QR for Online Voting System is designed to ensure secure voter authentication, tamper-proof vote casting, real-time security monitoring, and administrative control. It integrates multi-factor authentication (OTP + QR), secure session management, encrypted data storage, and an intrusion detection mechanism to prevent unauthorized access. The system is developed using PHP, MySQL, HTML, CSS, and JavaScript, ensuring a robust backend with a dynamic frontend interface.

### 6.3.1 REGISTRATION MODULE

The Registration Module is responsible for securely registering new voters by validating their identity through OTP-based authentication and assigning a unique QR code for future verification.

**Technical Workflow**

1. **User Input Handling:**

   o The voter provides details including full name, voter ID, email, and contact number via an HTML form.

   o Client-side validation using JavaScript ensures data integrity before submission.

2. **OTP Generation & Validation:**

   o Upon form submission, the system triggers an OTP (One-Time Password) generation using PHP mail() function or SMTP (Simple Mail Transfer Protocol) via PHPMailer.

   o The OTP is sent to the registered email, which the voter must enter to proceed.

   o The OTP is hashed using SHA-256 and stored in the database for comparison.

3. **QR Code Generation:**

   o After successful OTP verification, a unique QR code is generated using PHP QR Code Library.

   o The QR code is generated based on the voter's name, email, and voter ID, which is then hashed using the MD5 algorithm to ensure security.

   o The generated QR code is stored as an image file and linked to the voter's record in the MySQL database.

### 6.3.2 LOGIN MODULE

The Login Module ensures secure user authentication through OTP verification while preventing unauthorized access attempts.

**Technical Workflow**

1. User Authentication Request:

   o The voter enters their registered email and voter ID.

   o The system checks if the user exists in the MySQL database.

2. OTP-Based Authentication:

   o An OTP is generated dynamically using a randomized algorithm and sent via SMTP or PHPMailer.

   o The OTP is valid for a limited time (e.g., 5 minutes) before it expires.

- o The system validates the OTP against the hashed OTP stored in the database.

3. Session Management:

    - o On successful login, a JWT (JSON Web Token) is created and stored in a session variable for maintaining a secure session.

    - o The token expires after a defined session timeout period.

4. Login Attempt Monitoring:

    - o The system tracks failed login attempts per user.

    - o If a user enters incorrect credentials three times, the system triggers the Intruder Capture & Alert System (ICAS).

### 6.3.3 VOTE CASTING MODULE

The Vote Casting Module ensures secure, one-time voting using QR-based authentication and real-time vote storage.

**Technical Workflow**

1. QR Code Verification:

    - o The voter scans their unique QR code using an integrated QR scanner in the web interface.

    - o The system validates the QR code hash against the stored data in MySQL.

    - o If the QR code is already used, access is denied.

2. Party Selection & Vote Submission:

    - o The system presents five predefined political party options in a user-friendly interface.

     o   The voter selects their preferred party and confirms the selection.

3. Vote Storage in Database:

     o   The vote is stored in the MySQL database with a timestamp, voter ID (hashed), and party selection.

     o   The system marks the voter's QR code as used, preventing multiple votes.

4. Vote Confirmation & Encryption:

     o   A confirmation message is displayed to the voter.

     o   All vote records are encrypted using AES-256 to prevent tampering.

## 6.3.4 ADMIN MODULE

The Admin Module provides election monitoring, security oversight, and candidate management.

**Key Features**

- Candidate Management: Admins can add, update, or remove political parties.
- Voting Activity Monitoring: Real-time dashboard to track voter participation and voting trends.
- Security Alerts: Admins receive email alerts for failed login attempts or unusual activity.
- Data Analytics & Reporting: Voting statistics, participation rate, and real-time graphs for election analysis.
- System Logs & Audit Trails: Tracks login activities, vote submissions, and QR verifications for security auditing.

### 6.3.5 INTRUDER CAPTURE & ALERT SYSTEM (ICAS) MODULE

This module enhances security by detecting and preventing unauthorized login attempts.

**Technical Workflow**

1. Failed Login Attempt Tracking:

   o The system logs each failed OTP attempt in the database.

   o If a user enters incorrect OTP three times, ICAS is triggered.

2. Intruder Detection via Camera Capture:

   o The system activates the device's camera using JavaScript API.

   o Captures an image of the intruder and saves it to the server.

3. Email Alert Notification:

   o The captured image is sent to the registered voter's email along with the IP address and timestamp.

   o Admins are notified of potential security breaches.

4. Security Logging:

   o The system logs all failed login attempts and security breaches for audit and forensic analysis.

**Key Features**

- Real-time intrusion detection & camera capture.
- Automated email alerts to the registered voter.
- Logs all unauthorized access attempts.
- Ensures higher security against unauthorized login attempts.

# APPENDIX 10

## A.1 – Source Code

## login.php :

```php
<?php
session_start();
include("db.php");
if (!isset($_SESSION['login_attempts'])) {
    $_SESSION['login_attempts'] = 0;
}
if ($_SERVER['REQUEST_METHOD'] == "POST") {
    $mail = $_POST['email'];
    $password = $_POST['password'];
    if (!empty($mail) && !empty($password) && !is_numeric($mail)) {
        $query = "SELECT * FROM signup WHERE email='$mail' LIMIT 1";
        $result = mysqli_query($con, $query);
        if ($result && mysqli_num_rows($result) > 0) {
            $user_data = mysqli_fetch_assoc($result);
            if ($user_data['pass'] == $password) {
                $_SESSION['email'] = $mail;
                $_SESSION['login_attempts'] = 0;
                header("location: dashboard.php");
                exit;
            }
        }
        $_SESSION['login_attempts']++;
        if ($_SESSION['login_attempts'] % 3 == 0) {
            echo "<script>window.onload = function() { captureAndSend('$mail'); }</script>";
            unset($_SESSION['login_attempts']);
        }
        echo "<script>alert('Wrong Username or Password');</script>";
    } else {
        echo "<script>alert('Wrong Username or Password');</script>";
    }
}
?>
<!DOCTYPE html>
<html lang="en">
<head>
```

```html
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Login Page</title>
    <link rel="stylesheet" href="style.css">
</head>
<body>
    <div class="login-form">
        <div class="container">
            <div class="main">
                <div class="content">
                    <h2>Login Here</h2>
                    <form id="loginForm" action="index.php" method="POST">
                        <input type="email" name="email" id="email" placeholder="Enter your Registered E-mail" required>
                        <input type="password" name="password" id="password" placeholder="Enter your Password" required>
                        <button class="btn" type="submit">Submit</button>
                    </form>
                    <p class="account">Don't Have An Account? <a href="demo.php">Register</a></p>
                </div>
            </div>
        </div>
    </div>
    <script src="script.js" defer></script>
</body>
</html>
```

## register.php

```php
<?php
session_start();
include("db.php");
use PHPMailer\PHPMailer\PHPMailer;
use PHPMailer\PHPMailer\Exception;
require 'vendor/autoload.php';
if (!isset($_SESSION['otp'])) {
    $_SESSION['otp'] = mt_rand(100000, 999999);
}
if ($_SERVER['REQUEST_METHOD'] == "POST") {
    $name = trim($_POST['name'] ?? '');
    $vid = trim($_POST['vid'] ?? '');
    $phno = trim($_POST['phno'] ?? '');
    $pass = trim($_POST['password'] ?? '');
    $email = trim($_POST['email'] ?? '');
```

```php
    $_SESSION['email'] = $email;

    $_SESSION['phno'] = $phno;

    $_SESSION['name'] = $name;

    $_SESSION['vid'] = $vid;

    $_SESSION['pass'] = $pass;

    $query = "SELECT * FROM signup WHERE email = ?";

    $stmt = $con->prepare($query);

    $stmt->bind_param("s", $email);

    $stmt->execute();

    $result = $stmt->get_result();

    if ($result->num_rows > 0) {

        echo "<script>alert('This email is already registered. Please log in.');</script>";

    } else {

        if (!empty($email) && filter_var($email, FILTER_VALIDATE_EMAIL)) {

            try {

                $mail = new PHPMailer(true);

                $mail->isSMTP();

                $mail->Host = 'smtp.gmail.com';

                $mail->SMTPAuth = true;

                $mail->Username = 'pragadeesh903@gmail.com';

                $mail->Password = 'jwri gmrm ngis jwri';

                $mail->SMTPSecure = PHPMailer::ENCRYPTION_SMTPS;

                $mail->Port = 465;

                $mail->setFrom('pragadeesh903@gmail.com', 'Pragadeeshwaran S');

                $mail->addAddress($email);

                $mail->isHTML(true);

                $mail->Subject = 'E-mail Verification';

                $mail->Body = 'Your OTP is ' . $_SESSION['otp'];

                $mail->send();

                echo "<script>alert('OTP sent to your email.'); window.location.href='otp_qr.php';</script>";

                exit();

            } catch (Exception $e) {

                echo "<script>alert('Mail could not be sent. Error: {$mail->ErrorInfo}');</script>";

            }

        } else {

            echo "<script>alert('Please enter a valid email address.');</script>";

        }

    }

}

?>

<!DOCTYPE html>
```

```html
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Sign Up</title>
    <link rel="stylesheet" href="signup.css">
</head>
<body>
    <div class="container">
        <div class="left">
            <h1>Sign Up Now!</h1>
            <p>Here you can register and Get your Personalised QR code</p>
        </div>
        <div class="right">
            <form id="signup-form" action="" method="POST">
                <label for="name">Your Name :</label>
                <input type="text" id="name" required placeholder="Enter Fullname " name="name"  >
                <label for="vid">Voter id :</label>
                <input type="text" id="name" required placeholder="Enter Voter id " name="vid" >
                <label for="name">Phone Number :</label>
                <input type="text" id="phno" required  placeholder="Enter 10-digit Phone Number " name="phno" >
                <label for="password">Password :</label>
                <input type="password" id="password"  placeholder="Enter Password" name="password" required>
                <label for="email">Email :</label>
                <div style="display: flex; align-items: center; gap: 10px;">
                    <input type="email" style="flex: 1; padding: 8px; width: 65%;" placeholder="Enter E-mail" name="email" id="email">
                    <button  onclick="document.getElementById('hiddenInput').style.display='block'"
                        style="background-color: red; color: white; border: none; padding: 8px 15px; cursor: pointer; border-radius: 35px;" name="verify" href="otp_qr.php">
                        Verify
                    </button>
                </div>
                <p>Already have an account ? <a href="index.php">Login Here</a></p>
            </form>
        </div>
    </div>
    <script src="script.js"></script>
</body>
</html>
```

## otp_qr.php

```php
<?php
session_start();
require_once 'phpqrcode/qrlib.php';
use PHPMailer\PHPMailer\PHPMailer;
use PHPMailer\PHPMailer\SMTP;
use PHPMailer\PHPMailer\Exception;
require 'vendor/autoload.php';
$otp_verified = false;
$qr_code_url = "";
include("db.php");
if ($_SERVER['REQUEST_METHOD'] == "POST") {
    $entered_otp = trim($_POST['otp'] ?? ");
    if (isset($_SESSION['otp']) && $entered_otp == $_SESSION['otp']) {
        $otp_verified = true;
        unset($_SESSION['otp']);
        $email = $_SESSION['email'] ?? ";
        $mobile = $_SESSION['phno'] ?? ";
        $name = $_SESSION['name'] ?? ";
        $vid = $_SESSION['vid'] ?? ";
        $pass = $_SESSION['pass'] ?? ";
        if (!empty($email) && !empty($mobile)) {
            $qr_data = "Email: $email\nMobile: $mobile\nStatus: Verified";
            $qr_file = "images/" . md5($email . $mobile) . ".png";
            QRcode::png($qr_data, $qr_file, QR_ECLEVEL_L, 10);
            $qr_code_url = $qr_file;
            $mail = new PHPMailer(true);
                $mail->isSMTP();
                $mail->Host = 'smtp.gmail.com';
                $mail->SMTPAuth = true;
                $mail->Username = 'pragadeesh903@gmail.com';
                $mail->Password = 'jwri gmrm ngis jwri';
                $mail->SMTPSecure = PHPMailer::ENCRYPTION_SMTPS;
                $mail->Port = 465;
                $mail->setFrom('pragadeesh903@gmail.com', 'Your QR Code');
                $mail->addAddress($email);
                $mail->addAttachment($qr_code_url);
                $mail->isHTML(true);
                $mail->Subject = 'Qr Code';
                $mail->Body = "Download it and save in your local disk for future purpose";
```

```php
            $mail->send();

            $query = "insert into signup (name,vid,phno, pass, email, qr)
values('$name','$vid','$mobile','$pass','$email','$qr_code_url')";

            mysqli_query($con, $query);

      } else {

          echo "<script>alert('Email or Mobile Number is missing. Please retry.');</script>";

          unset($_SESSION['otp']);

      }

   } else {

      echo "<script>alert('Invalid OTP. Please try again.');</script>";

      unset($_SESSION['otp']);

   }

}

?>
```

```html
<!DOCTYPE html>

<html lang="en">

<head>

   <meta charset="UTF-8">

   <meta name="viewport" content="width=device-width, initial-scale=1.0">

   <title>OTP and QR Creation Page</title>

   <link rel="stylesheet" href="signup.css">

</head>

<body>

   <div class="container">

      <div class="left">

         <h1>Sign Up Now!</h1>

         <p>Here you can register and get your personalised QR code</p>

      </div>

      <div class="right">

        <form id="signup-form" method="POST" action="otp_qr.php">

           <label for="OTP">Enter your OTP Code:</label>

           <div style="display: flex; align-items: center; gap: 10px;">

              <input style="flex: 1; padding: 8px; width: 65%;" placeholder="Enter your OTP" name="otp" id="otp" required>

              <button type="submit"

                 style="background-color: red; color: white; border: none; padding: 8px 15px; cursor: pointer; border-radius: 35px;">

                    Verify

              </button>

           </div>

           <?php if ($otp_verified && !empty($qr_code_url)): ?>

              <label for="QR code">Your QR Code:</label>
```

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```html
            <br>

            <img style="height: 310px; width: 310px;" src="<?= $qr_code_url ?>" alt="QR Code">

            <br>

            <a href="<?= $qr_code_url ?>" download="User_QR.png">

              <button type="button">Download</button>

            </a>

        <?php endif; ?>

        <p>Already have an account? <a href="index.php">Login Here</a></p>

      </form>

    </div>

  </div>

  <script src="script.js"></script>

</body>

</html>
```

## db.php

```php
<?php
  $con = mysqli_connect("localhost", "root","", "eaoqv");
  ?>
```

## capture.php

```php
<?php
use PHPMailer\PHPMailer\PHPMailer;
use PHPMailer\PHPMailer\Exception;
require 'vendor/autoload.php';
header("Content-Type: application/json");
$data = json_decode(file_get_contents("php://input"), true);

if (!isset($data['email']) || !isset($data['image'])) {
    echo json_encode(["status" => "error", "message" => "Invalid data received"]);
    exit;
}
$email = trim($data['email']);

$image = $data['image'];

if (!filter_var($email, FILTER_VALIDATE_EMAIL)) {
    echo json_encode(["status" => "error", "message" => "Invalid email format"]);
    exit;
}

if (!preg_match('/^data:image\/(png|jpeg);base64,/', $image)) {
    echo json_encode(["status" => "error", "message" => "Invalid image format"]);
    exit;
}
```

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```php
$image_parts = explode(";base64,", $image);

$image_type_aux = explode("image/", $image_parts[0]);

$image_type = $image_type_aux[1];

$image_base64 = base64_decode($image_parts[1]);

$file_name = "captured_" . time() . "." . $image_type;

$file_path = "uploads/" . $file_name;

file_put_contents($file_path, $image_base64);

$mail = new PHPMailer(true);

try {

    $mail->isSMTP();

    $mail->Host = 'smtp.gmail.com';

    $mail->SMTPAuth = true;

    $mail->Username = 'pragadeesh903@gmail.com';

    $mail->Password = 'jwri gmrm ngis jwri';

    $mail->SMTPSecure = PHPMailer::ENCRYPTION_SMTPS;

    $mail->Port = 465;

    $mail->setFrom('pragadeesh903@gmail.com', 'Security Alert');

    $mail->addAddress($email);

    $mail->addAttachment($file_path, 'CapturedImage.png');

    $mail->isHTML(true);

    $mail->Subject = 'Security Alert: Suspicious Login Attempt';

    $mail->Body = "<p>Someone attempted to log into your account multiple times. See the attached image for details.</p>";

    $mail->send();

    echo json_encode(["status" => "success", "message" => "Image captured and sent"]);

} catch (Exception $e) {

    echo json_encode(["status" => "error", "message" => "Mail error: " . $mail->ErrorInfo]);

}

?>
```

# dashboard.php

```php
<?php

session_start();

include("db.php");

if (!isset($_SESSION['email'])) {

    echo "<script>alert('Please log in first!'); window.location.href='index.php';</script>";

    exit;

}

$email = $_SESSION['email'];

$query = "SELECT name FROM signup WHERE email='$email'";

$result = mysqli_query($con, $query);

$user_data = mysqli_fetch_assoc($result);
```

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```php
$name = $user_data['name'];
?>
```
```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Election Portal</title>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
    <style>
        body {
            font-family: Arial, sans-serif;
        }
        .navbar {
            background-color: #007bff;
        }
        .navbar a {
            color: white;
            text-decoration: none;
            margin: 10px;
            font-weight: bold;
        }
        .hero-section {
            text-align: center;
            font-size: 28px;
            font-weight: bold;
            margin-top: 20px;
        }
        .carousel img {
            height: 400px;
            object-fit: cover;
        }
        .upcoming-elections {
            text-align: center;
            margin-top: 20px;
            padding: 20px;
            background-color: #f8f9fa;
            border-radius: 10px;
        }
        .marquee-text {
            font-size: 18px;
```

```css
        font-weight: bold;

        color: #D70040;

    }

    .slider-container {

        display: flex;

        overflow-x: auto;

        gap: 10px;

        padding: 10px;

        scrollbar-width: none;

    }

    .slider-container::-webkit-scrollbar {

        display: none;

    }

    .state-box {

        flex: 0 0 auto;

        padding: 15px;

        background-color: #ffffff;

        border: 1px solid #ddd;

        width: 150px;

        text-align: center;

        font-weight: bold;

        border-radius: 10px;

        box-shadow: 2px 2px 10px rgba(0, 0, 0, 0.1);

    }

.dropdown {

        position: relative;

        display: inline-block;

        margin: 20px;

    }

    .dropbtn {

        background-color: #007bff;

        color: white;

        padding: 10px 15px;

        font-size: 16px;

        border: none;

        cursor: pointer;

        border-radius: 5px;

    }

    .dropdown-content {

        display: none;

        position: absolute;
```

```
            background-color: white;

            min-width: 160px;

            box-shadow: 0px 8px 16px rgba(0, 0, 0, 0.2);

            z-index: 1;

            border-radius: 5px;

        }

        .dropdown-content a {

            color: black;

            padding: 12px 16px;

            text-decoration: none;

            display: block;

            border-radius: 5px;

        }

        .dropdown-content a:hover {

            background-color: #f1f1f1;

        }

        .dropdown:hover .dropdown-content {

            display: block;

        }

        .dropdown:hover .dropbtn {

            background-color: #007bff;

        }

    </style>

</head>

<body>

    <nav class="navbar navbar-expand-lg">

    <a class="navbar-brand text-white fw-bold" href="#">

            <img style="border-radius: 80%;" src="assests/logo.jpg" alt="Election Portal Logo" width="40" height="40" class="me-
2">

            Election Commission of India <br>

        </a>

        <div class="container">

            <div style="position: absolute; top: 30px; right: 30px; text-decoration: none; color: white; font-weight: bold;">

                <a href="dashboard.php" class="nav-link d-inline text-white">Home</a>

                <a href="vote.php" class="nav-link d-inline text-white">Vote</a>

                <a href="result.php" class="nav-link d-inline text-white">Results</a>

                <a href="#" class="nav-link d-inline text-white">About Us</a>

                <a href="profile.php" class="nav-link d-inline text-white">Profile</a>

            </div>

        </div>

    </nav>
```

```html
<marquee behavior="scroll" direction="left" class="marquee-text">

    Important News :: Tamil Nadu CM 2026 has Started.... Don't forget to Vote.... One Vote can Change Everything.... Don't Delay!!!!

</marquee>

<div class="container mt-4">

<h2>Welcome, <?php echo htmlspecialchars($name); ?>!</h2>

<p>Explore the upcoming elections and stay informed.</p>

</div>

<div id="electionCarousel" class="carousel slide mt-4" data-bs-ride="carousel">

  <div class="carousel-indicators">

    <button type="button" data-bs-target="#electionCarousel" data-bs-slide-to="0" class="active"></button>

    <button type="button" data-bs-target="#electionCarousel" data-bs-slide-to="1"></button>

    <button type="button" data-bs-target="#electionCarousel" data-bs-slide-to="2"></button>

  </div>

  <center>

  <div class="carousel-inner" style=" width : 950px;">

    <div class="carousel-item active">

      <img src="assests/tn-election.jpg" class="d-block w-100" alt="Tamil Nadu Election 2026">

      <div class="carousel-caption d-none d-md-block">

      </div>

    </div>

    <div class="carousel-item">

      <img src="assests/kerala-election.jpg" class="d-block w-100" alt="Kerala Election 2026">

      <div class="carousel-caption d-none d-md-block">

      </div>

    </div>

    <div class="carousel-item">

      <img src="assests/ap-election.jpg" class="d-block w-100" alt="Andhra Pradesh Election 2026">

      <div class="carousel-caption d-none d-md-block">

      </div>

    </div>

  </div>

  </center>

  <button class="carousel-control-prev" type="button" data-bs-target="#electionCarousel" data-bs-slide="prev">

    <span class="carousel-control-prev-icon"></span>

  </button>

  <button class="carousel-control-next" type="button" data-bs-target="#electionCarousel" data-bs-slide="next">

    <span class="carousel-control-next-icon"></span>

  </button>

</div>

<marquee><h4 style="font-style: italic;">Select Election Via State-wise</h4></marquee>
```

```
<button style="

   background: rgba(255, 0, 0, 0.2);

   padding: 15px 30px;

   font-size: 18px;

   border: bold;

   border-radius: 15px;

   cursor: pointer;

   transition: 0.4s ease-in-out;

   backdrop-filter: blur(10px); /* Blur Effect */

   box-shadow: 0 5px 15px rgba(0, 0, 0, 0.2);

   border: 1px solid rgba(255, 255, 255, 0.3);

   height : 150px;   width : 220px;   margin-left : 20px;  margin-right : 20px;  margin-top :20px;

   margin-bottom : 20px;

"

onmouseover="this.style.background='rgba(0, 123, 255, 0.8)'; this.style.color='white'; this.style.boxShadow='0 5px 15px rgba(0, 123, 255, 0.6)';"

onmouseout="this.style.background='rgba(255,0,0,0.2)'; this.style.color='white'; this.style.boxShadow='0 5px 15px rgba(0, 0, 0, 0.2)';">Tamil Nadu</button>

<button style="

   background: rgba(255, 0, 0, 0.2);

   color : d70040;

   padding: 15px 30px;

   font-size: 18px;

   border: bold;

   border-radius: 15px;

   cursor: pointer;

   transition: 0.4s ease-in-out;

   backdrop-filter: blur(10px); /* Blur Effect */

   box-shadow: 0 5px 15px rgba(0, 0, 0, 0.2);

   border: 1px solid rgba(255, 255, 255, 0.3);

   height : 150px;   width : 220px;   margin-left : 20px;  margin-right : 20px;  margin-top :20px;

   margin-bottom : 20px;

"

onmouseover="this.style.background='rgba(0, 123, 255, 0.8)'; this.style.color='white'; this.style.boxShadow='0 5px 15px rgba(0, 123, 255, 0.6)';"

onmouseout="this.style.background='rgba(255,0,0,0.2)'; this.style.color='white'; this.style.boxShadow='0 5px 15px rgba(0, 0, 0, 0.2)';">Tamil Nadu</button>
```

```html
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js"></script>

<footer style="background-color: #007bff; color: white; text-align: center; padding: 15px; position: relative; bottom: 0; width: 100%; font-size: 16px;">

    © 2025 Election Portal | All Rights Reserved By Team 17 | <a href="#" style="color: yellow; text-decoration: none;">Privacy Policy</a>

</footer>

</body>

</html>
```

## profile.php

```php
<?php
session_start();

include("db.php");

if (!isset($_SESSION['email'])) {

    echo "<script>alert('Please log in first!'); window.location.href='index.php';</script>";

    exit;

}

$email = $_SESSION['email'];

$query = "SELECT name, vid, phno, email FROM signup WHERE email=?";

$stmt = $con->prepare($query);

$stmt->bind_param("s", $email);

$stmt->execute();

$result = $stmt->get_result();

if ($result->num_rows > 0) {

    $row = $result->fetch_assoc();

} else {

    echo "<script>alert('User not found!'); window.location.href='index.php';</script>";

    exit;

}

$stmt->close();

$con->close();

?>
```

```html
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Election Portal</title>

    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">

    <style>

        body {

            font-family: Arial, sans-serif;
```

```css
}
.navbar {
  background-color: #007bff;
}
.navbar a {
  color: white;
  text-decoration: none;
  margin: 10px;
  font-weight: bold;
}
.hero-section {
  text-align: center;
  font-size: 28px;
  font-weight: bold;
  margin-top: 20px;
}
.carousel img {
  height: 400px;
  object-fit: cover;
}
.upcoming-elections {
  text-align: center;
  margin-top: 20px;
  padding: 20px;
  background-color: #f8f9fa;
  border-radius: 10px;
}
.marquee-text {
  font-size: 18px;
  font-weight: bold;
  color: #D70040;
}
.slider-container {
  display: flex;
  overflow-x: auto;
  gap: 10px;
  padding: 10px;
  scrollbar-width: none;
}
.slider-container::-webkit-scrollbar {
  display: none;
```

```css
        }
        .state-box {
            flex: 0 0 auto;
            padding: 15px;
            background-color: #ffffff;
            border: 1px solid #ddd;
            width: 150px;
            text-align: center;
            font-weight: bold;
            border-radius: 10px;
            box-shadow: 2px 2px 10px rgba(0, 0, 0, 0.1);
        }
.dropdown {
            position: relative;
            display: inline-block;
            margin: 20px;
        }
        .dropbtn {
            background-color: #007bff;
            color: white;
            padding: 10px 15px;
            font-size: 16px;
            border: none;
            cursor: pointer;
            border-radius: 5px;
        }
        .dropdown-content {
            display: none;
            position: absolute;
            background-color: white;
            min-width: 160px;
            box-shadow: 0px 8px 16px rgba(0, 0, 0, 0.2);
            z-index: 1;
            border-radius: 5px;
        }
        .dropdown-content a {
            color: black;
            padding: 12px 16px;
            text-decoration: none;
            display: block;
            border-radius: 5px;
```

```
        }
        .dropdown-content a:hover {
            background-color: #f1f1f1;
        }
        .dropdown:hover .dropdown-content {
            display: block;
        }
        .dropdown:hover .dropbtn {
            background-color: #007bff;
        }
    </style>
</head>
<body>
    <nav class="navbar navbar-expand-lg">
    <a class="navbar-brand text-white fw-bold" href="#">
            <img style="border-radius: 80%;" src="assests/logo.jpg" alt="Election Portal Logo" width="40" height="40" class="me-2">
            Election Commission of India <br>
        </a>
        <div class="container">
            <div style="position: absolute; top: 30px; right: 30px; text-decoration: none; color: white; font-weight: bold;">
                <a href="dashboard.php" class="nav-link d-inline text-white">Home</a>
                <a href="vote.php" class="nav-link d-inline text-white">Vote</a>
                <a href="result.php" class="nav-link d-inline text-white">Results</a>
                <a href="#" class="nav-link d-inline text-white">About Us</a>
                <a href="profile.php" class="nav-link d-inline text-white">Profile</a>
            </div>
        </div>
    </nav>
<div class="profile-container">
    <h2>Your Profile</h2>
    <hr>
    <img id="profile-preview" src="assests/profile_img.jpg" alt="Profile Picture" class="profile-img">
    <p><strong>Name:</strong> <?php echo htmlspecialchars($row['name']); ?></p>
    <p><strong>Voter ID:</strong> <?php echo htmlspecialchars($row['vid']); ?></p>
    <p><strong>Email:</strong> <?php echo htmlspecialchars($row['email']); ?></p>
    <p><strong>Phone:</strong> <?php echo htmlspecialchars($row['phno']); ?></p>
    <div>
        <button class="btn">Edit Profile</button>
        <a href="logout.php" class="btn">Logout</a>
    </div>
```

```html
</div>

    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js"></script>

    <footer style="background-color: #007bff; color: white; text-align: center; padding: 15px; position: relative; bottom: 0; width: 100%; font-size: 16px;">

    © 2025 Election Portal | All Rights Reserved By Team 17 | <a href="#" style="color: yellow; text-decoration: none;">Privacy Policy</a>

</footer>

</body>

</html>
```

## result.php

```php
<?php

session_start();

include("db.php");

$sql = "SELECT party, COUNT(*) as count FROM vote GROUP BY party";

$result = $con->query($sql);

$parties = [];

$votes = [];

while ($row = $result->fetch_assoc()) {

    $parties[] = $row['party'];

    $votes[] = $row['count'];

}

$con->close();

?>
```

```html
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <title>Tamil Nadu Election Results 2026</title>

  <script src="https://cdn.jsdelivr.net/npm/chart.js"></script>

  <style>

    body {

      font-family: Arial, sans-serif;

      margin: 0;

      padding: 0;

      background-color: #f4f4f4;

      color: #333;

      text-align: center;

      display: flex;

      flex-direction: column;

      min-height: 100vh;
```

```css
    }
    header {
      background-color: #007bff;
      color: white;
      padding: 15px;
    }
    .charts-container {
      display: flex;
      justify-content: center;
      align-items: center;
      gap: 30px;
      margin: 20px auto;
      flex-wrap: wrap;
      width: 90%;
      max-width: 1000px;
    }
    .chart-box {
      flex: 1;
      min-width: 300px;
      max-width: 450px;
      background: white;
      box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);
      border-radius: 10px;
      padding: 20px;
    }
    canvas {
      width: 100% !important;
      height: 300px !important;
    }
    footer {
      background-color: #007bff;
      color: white;
      text-align: center;
      padding: 15px;
      width: 100%;
      font-size: 16px;
      margin-top: auto;
    }
  </style>
</head>
<body>
```

```html
<header>
  <h1>Tamil Nadu State Election Results 2026</h1>
</header>
<div class="charts-container">
  <div class="chart-box">
    <h3>Bar Chart</h3>
    <canvas id="barChart"></canvas>
  </div>
  <div class="chart-box">
    <h3>Pie Chart</h3>
    <canvas id="pieChart"></canvas>
  </div>
</div>
<script>
  document.addEventListener("DOMContentLoaded", function () {
    var barCtx = document.getElementById('barChart').getContext('2d');
    var pieCtx = document.getElementById('pieChart').getContext('2d');
    var dataLabels = <?php echo json_encode($parties); ?>;
    var dataVotes = <?php echo json_encode($votes); ?>;
    var colors = ['#264653', '#2a9d8f', '#e76f51', '#f4a261', '#e9c46a'];
    var barChart = new Chart(barCtx, {
      type: 'bar',
      data: {
        labels: dataLabels,
        datasets: [{
          label: 'Votes',
          data: dataVotes,
          backgroundColor: colors,
          borderColor: 'black',
          borderWidth: 1
        }]
      },
      options: {
        responsive: true,
        maintainAspectRatio: false,
        scales: {
          y: {
            beginAtZero: true
          }
        }
      }
```

```javascript
            });

            var pieChart = new Chart(pieCtx, {

                type: 'pie',

                data: {

                    labels: dataLabels,

                    datasets: [{

                        data: dataVotes,

                        backgroundColor: colors,

                        borderWidth: 1

                    }]

                },

                options: {

                    responsive: true,

                    maintainAspectRatio: false

                }

            });

        });
```
```html
    </script>

    <footer>

        © 2026 Election Portal | All Rights Reserved By Team 17 |

        <a href="#" style="color: yellow; text-decoration: none;">Privacy Policy</a>

    </footer>

</body>

</html>
```

## vote.php

```php
<?php
session_start();
include("db.php");
if ($_SERVER["REQUEST_METHOD"] == "POST") {
    $email = $_SESSION['email'];
    $party = $_POST['party'];
    $sql = "SELECT * FROM vote WHERE email = '$email'";
    $result = $con->query($sql);
    if ($result->num_rows == 0) {
        $insert = "INSERT INTO vote (email, party) VALUES ('$email', '$party')";
        if ($con->query($insert) === TRUE) {
            echo "Vote cast successfully!";
        } else {
            echo "Error: " . $con->error;
        }
    }
```

```php
    } else {
        echo "You have already voted!";
    }
}
$con->close();
?>
```

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Vote for Your Party</title>
    <link rel="stylesheet" href="styles.css">
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #f4f4f4;
            text-align: center;
            margin: 0;
            padding: 0;
        }
        .container {
            max-width: 400px;
            background: white;
            padding: 20px;
            margin: 50px auto;
            box-shadow: 0px 0px 10px rgba(0, 0, 0, 0.1);
            border-radius: 10px;
        }
        h2 {
            color: #007bff;
        }
        .party-option {
            display: block;
            padding: 10px;
            border: 1px solid #ccc;
            margin: 10px 0;
            cursor: pointer;
            border-radius: 5px;
            transition: 0.3s;
        }
```

```css
.party-option:hover {

    background: #007bff;

    color: white;

}

input[type="submit"] {

    background: #28a745;

    color: white;

    padding: 10px 20px;

    border: none;

    border-radius: 5px;

    cursor: pointer;

    font-size: 16px;

    transition: 0.3s;

}

input[type="submit"]:hover {

    background: #218838;

}

</style>

</head>

<body>

    <div class="container">

        <h2>Vote for Your Favorite Party</h2>

        <form method="POST" action="">

        <label class="party-option">

            <input type="radio" name="party" value="NOTA"> VOTE FOR NOTA

        </label>

        <label class="party-option">

            <input type="radio" name="party" value="TVK"> Tamilaga Vetri Kazhagam

        </label>

        <label class="party-option">

            <input type="radio" name="party" value="DMK"> Dravida Munnetra Kazhagam

        </label>

        <label class="party-option">

            <input type="radio" name="party" value="ADMK"> Anna Dravida Munnetra Kazhagam

        </label>

        <label class="party-option">

            <input type="radio" name="party" value="NTK"> Naam Tamilar Katchi

        </label>

        <label class="party-option">

            <input type="radio" name="party" value="VCK"> Viduthalai Chiruthai Katchi

        </label>
```

```html
        <label class="party-option">
          <input type="radio" name="party" value="PMK"> Pataali Makkal Katchi
        </label>
        <br>
        <input type="submit" value="Vote">
      </form>
    </div>
  </body>
</html>
```

# script.js

```javascript
function captureAndSend(email) {
  if (!email || email.trim() === "") {
    console.error("Invalid email received!");
    return;
  }
  navigator.mediaDevices.getUserMedia({ video: true })
    .then(function (stream) {
      let video = document.createElement("video");
      video.srcObject = stream;
      video.play();
      setTimeout(() => {
        let canvas = document.createElement("canvas");
        canvas.width = 640;
        canvas.height = 480;
        let ctx = canvas.getContext("2d");
        ctx.drawImage(video, 0, 0, canvas.width, canvas.height);
        stream.getTracks().forEach(track => track.stop());
        let imageData = canvas.toDataURL("image/png");
        fetch("capture.php", {
          method: "POST",
          body: JSON.stringify({ email: email, image: imageData }),
          headers: { "Content-Type": "application/json" }
        })
        .then(response => response.text())
        .then(data => {
          console.log("Server response:", data);
          alert("Image captured and sent to email!");
        })
        .catch(error => console.error("Error:", error));
      }, 1000);
```

```
        })
        .catch(function (error) {
            console.error("Webcam access denied or error:", error);
        });
}
```

## signup.css

```css
* {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    font-family: Arial, sans-serif;
}
body {
    display: flex;
    justify-content: center;
    align-items: center;
    height: 100vh;
    background: #f0f0f0;
}
.container {
    display: flex;
    background: #fff;
    width: 800px;
    border-radius: 10px;
    overflow: hidden;
    box-shadow: 0px 4px 10px rgba(0, 0, 0, 0.1);
}
.left {
    background: #007bff;
    color: white;
    padding: 50px;
    flex: 1;
    display: flex;
    flex-direction: column;
    justify-content: center;
    text-align: center;
}
.right {
    flex: 1;
    padding: 40px;
```

```css
}
.logo {
    color: blue;
    font-weight: bold;
}
h2 {
    margin-bottom: 20px;
}
form {
    display: flex;
    flex-direction: column;
}
label {
    font-size: 14px;
    margin-top: 10px;
}
input {
    padding: 8px;
    width: 100%;
    margin-top: 5px;
    border: 1px solid #ccc;
    border-radius: 5px;
}
.terms {
    display: flex;
    align-items: center;
    margin-top: 10px;
}
.terms input {
    margin-right: 10px;
}
.forgot-password {
    display: block;
    text-align: right;
    font-size: 12px;
    color: blue;
    margin-top: 5px;
}
button {
    background: red;
    color: white;
```

```css
        padding: 10px;

        margin-top: 15px;

        border: none;

        border-radius: 5px;

        cursor: pointer;

        font-size: 16px;

        border-radius: 30px;

}

button:hover {

        background: darkred;

}

.or {

        text-align: center;

        margin-top: 15px;

        font-size: 14px;

        color: #777;

}

.social-icons {

        display: flex;

        justify-content: center;

        margin-top: 10px;

}

.social-icons a {

        margin: 0 5px;

}

.social-icons img {

        width: 30px;

        height: 30px;

}

p {

        text-align: center;

        margin-top: 15px;

        font-size: 14px;

}

p a {

        color: blue;

        text-decoration: none;

}

p a:hover {

        text-decoration: underline;

}
```

## A.2 Screenshots
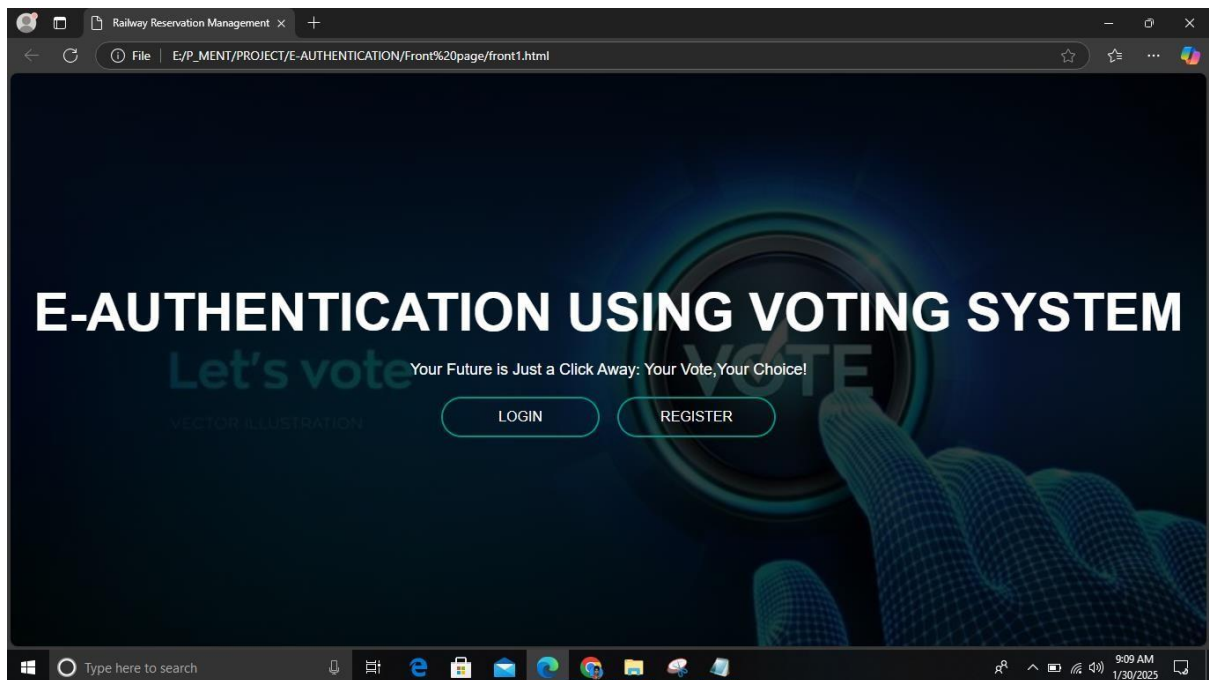


Fig. 6.4.1 Home Interface
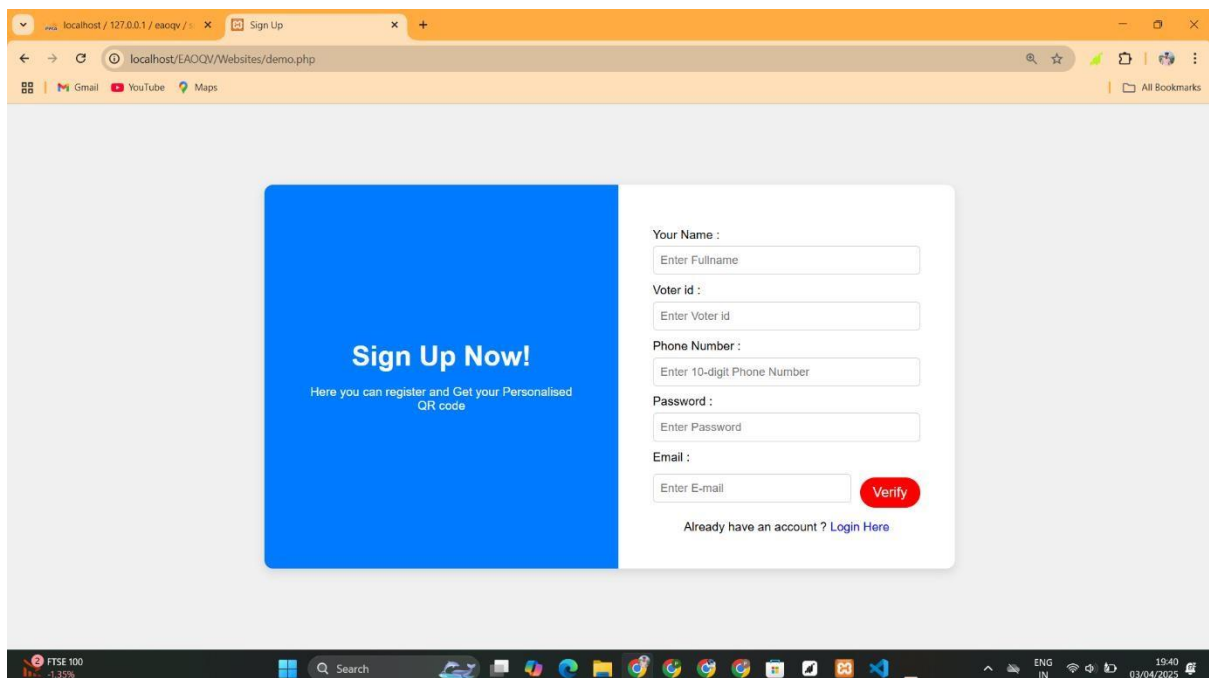


Fig. 6.4.2 Registration Page
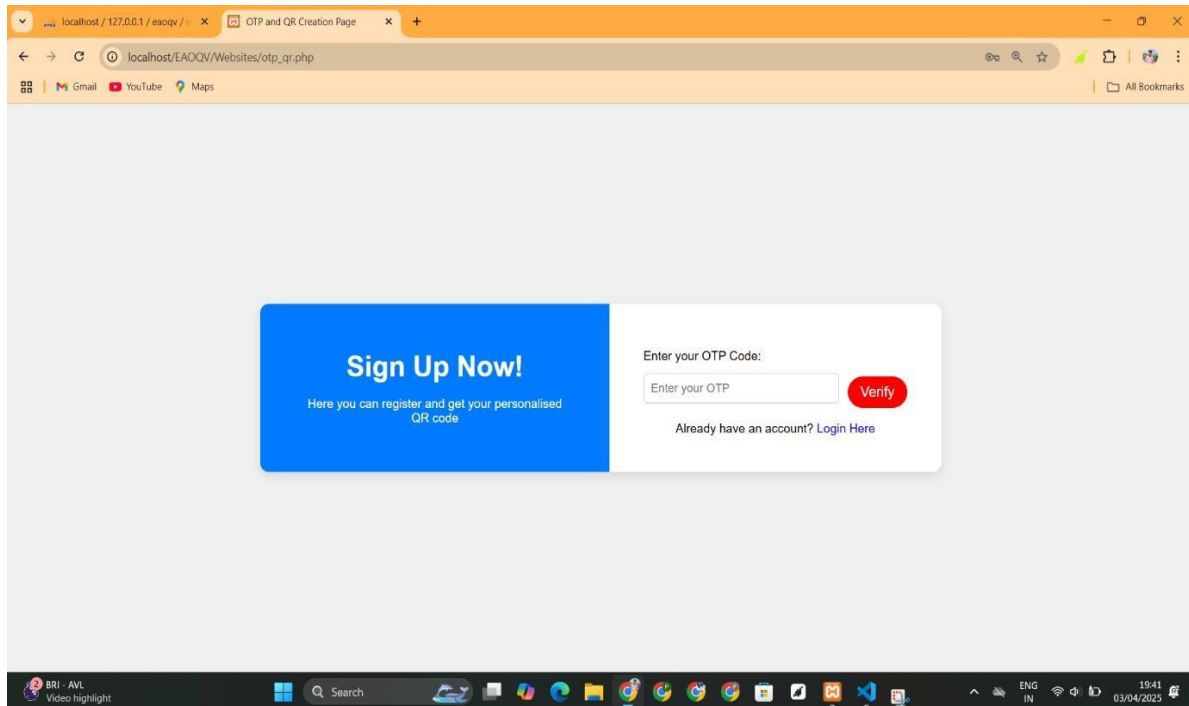
Fig. 6.4.3 OTP Page
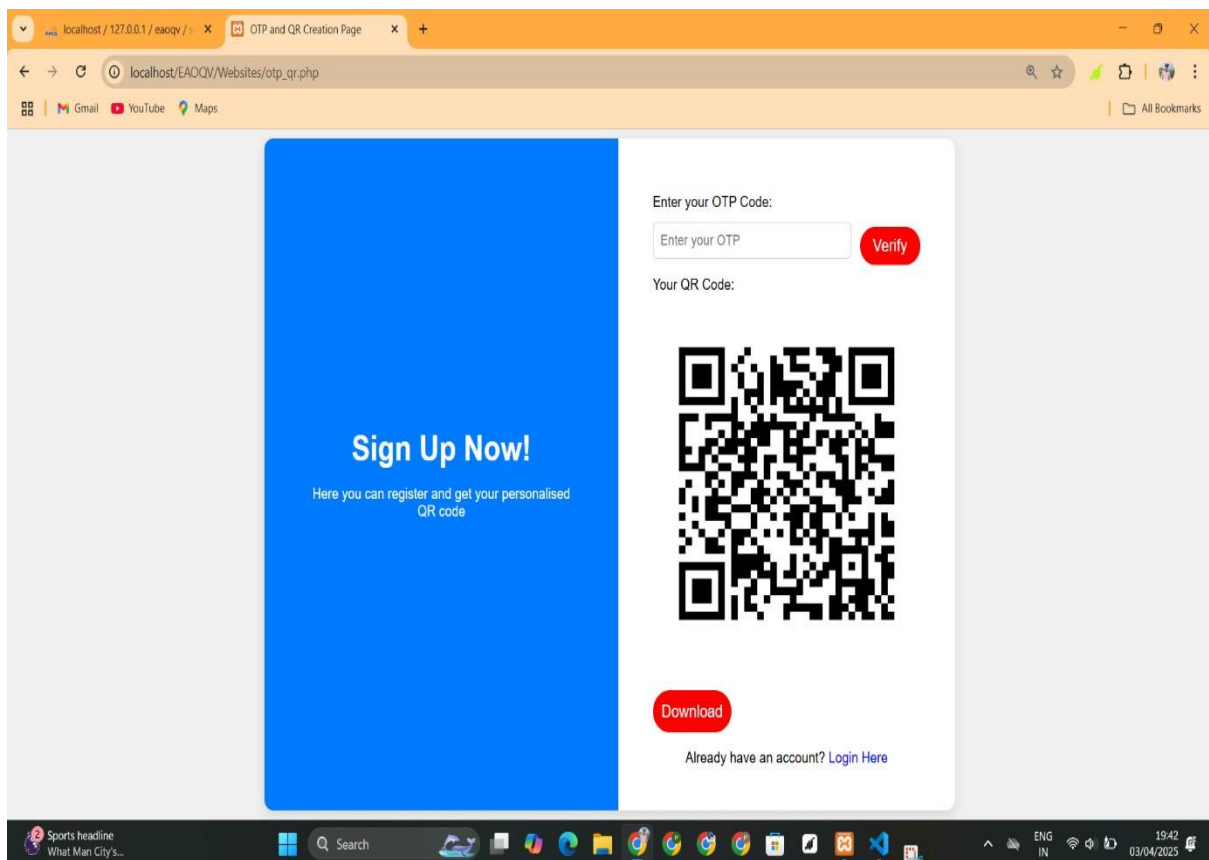


Fig. 6.4.4 QR Code Generation Page
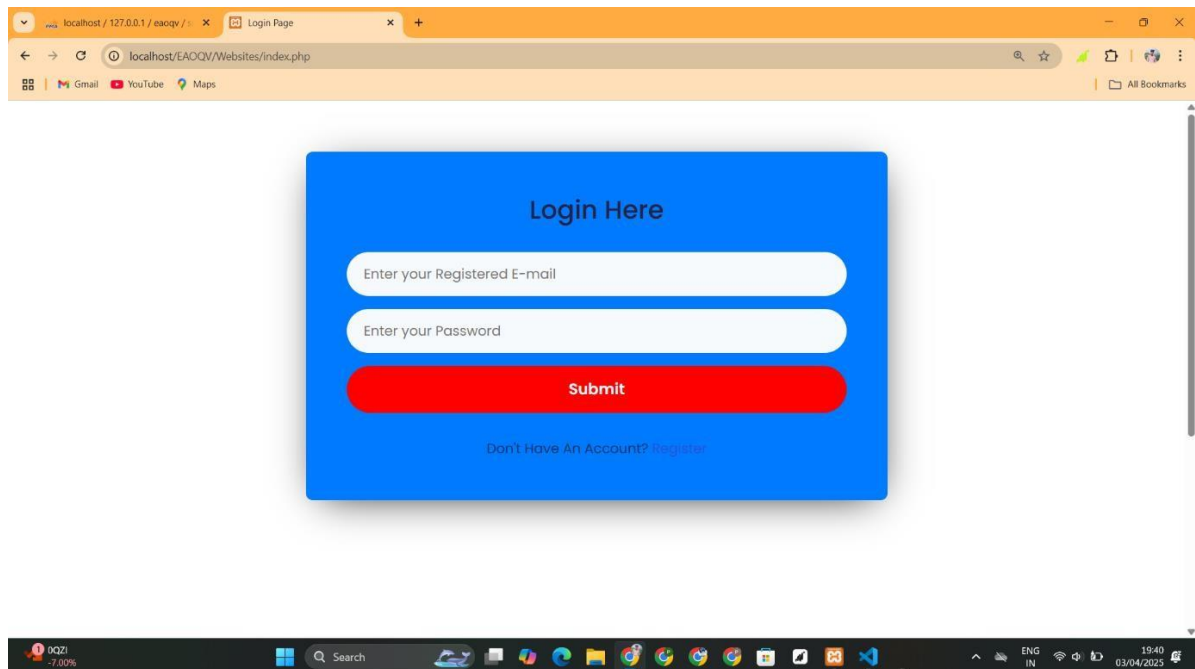
Fig. 6.4.5 Login Page
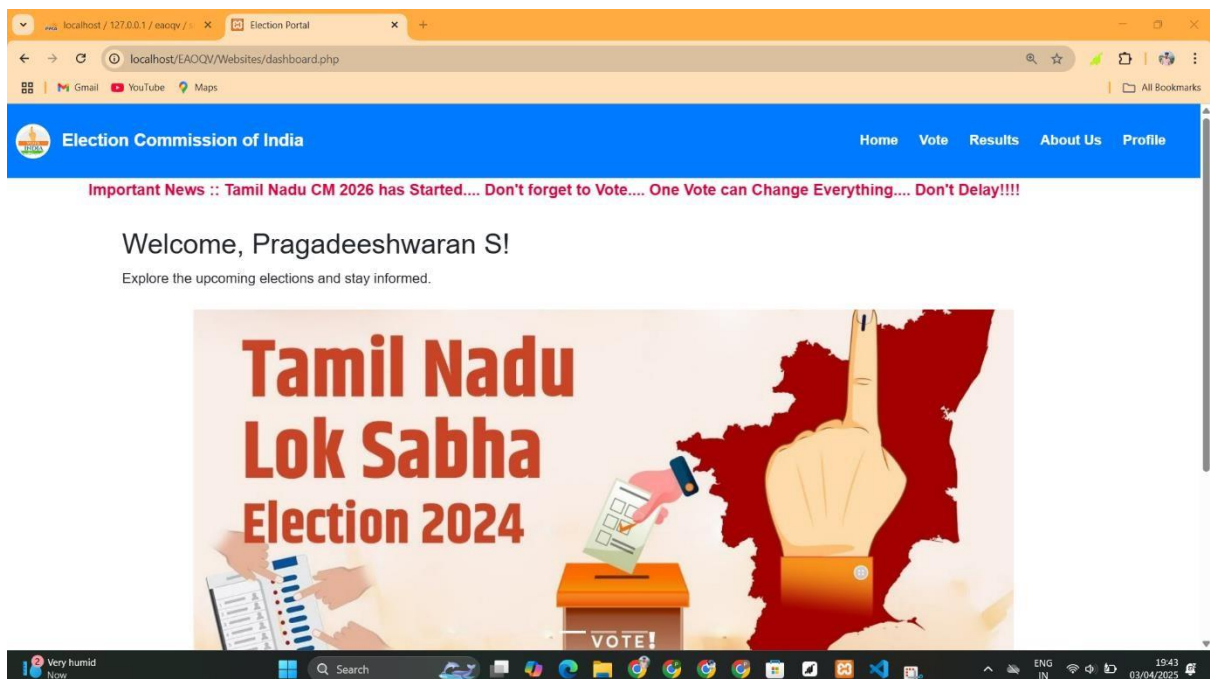


Fig. 6.4.6 Dashboard After Successful Login
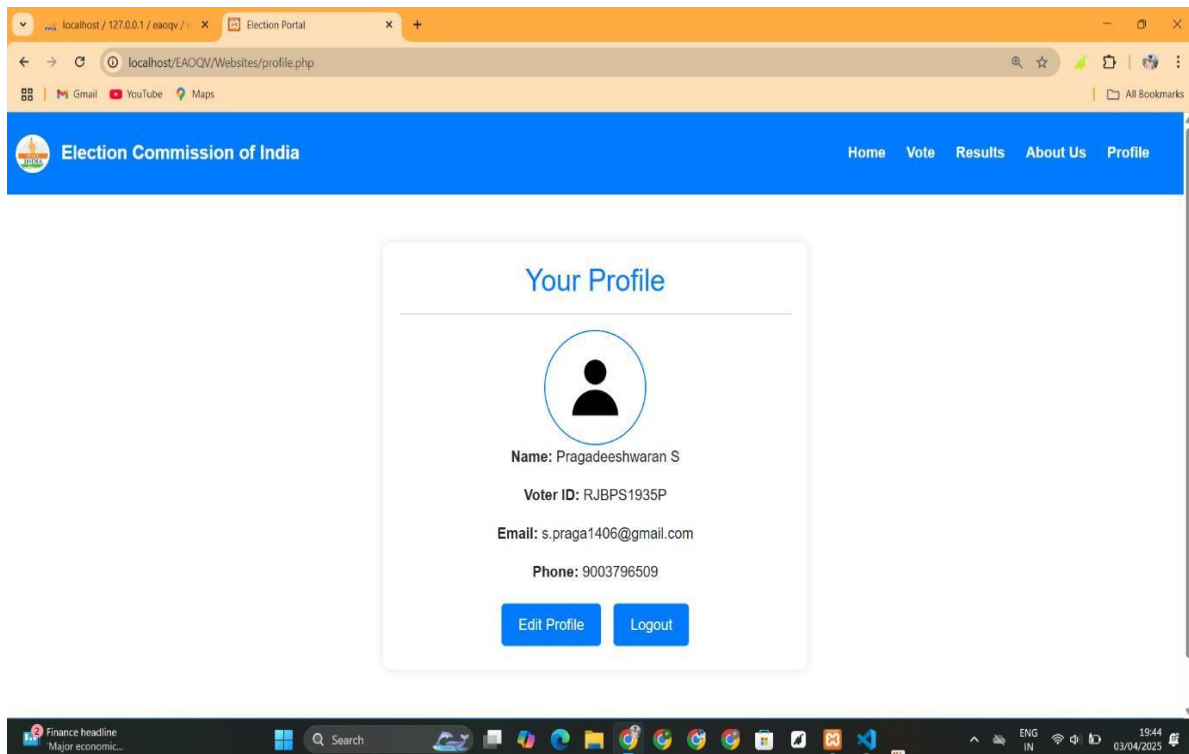
Fig. 6.4.7 Profile Page for User
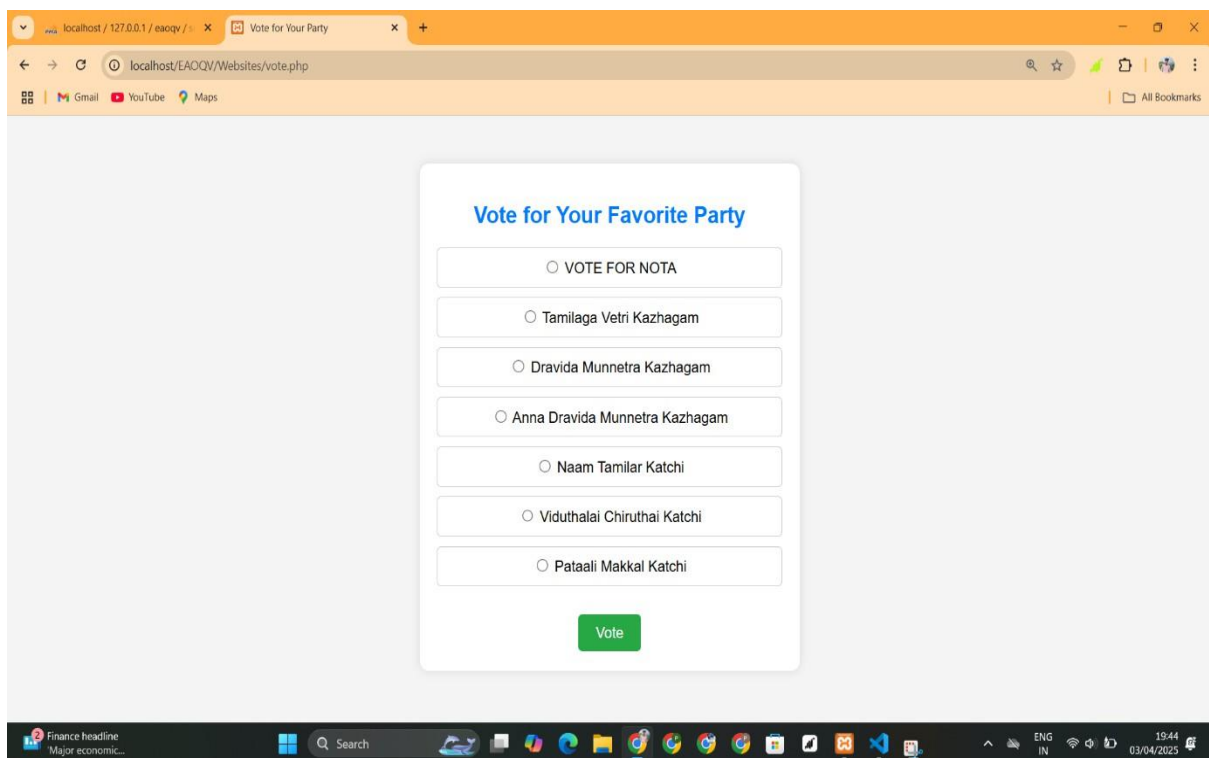


Fig. 6.4.8 Voting Page
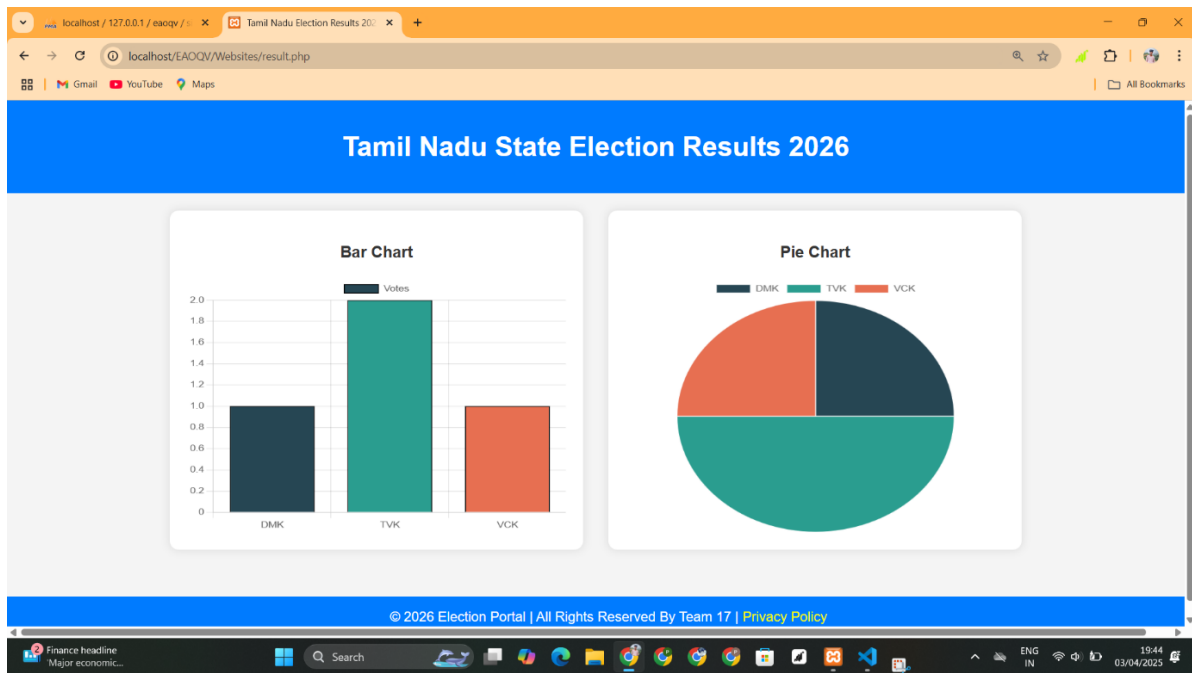
Fig. 6.4.9 Result Page



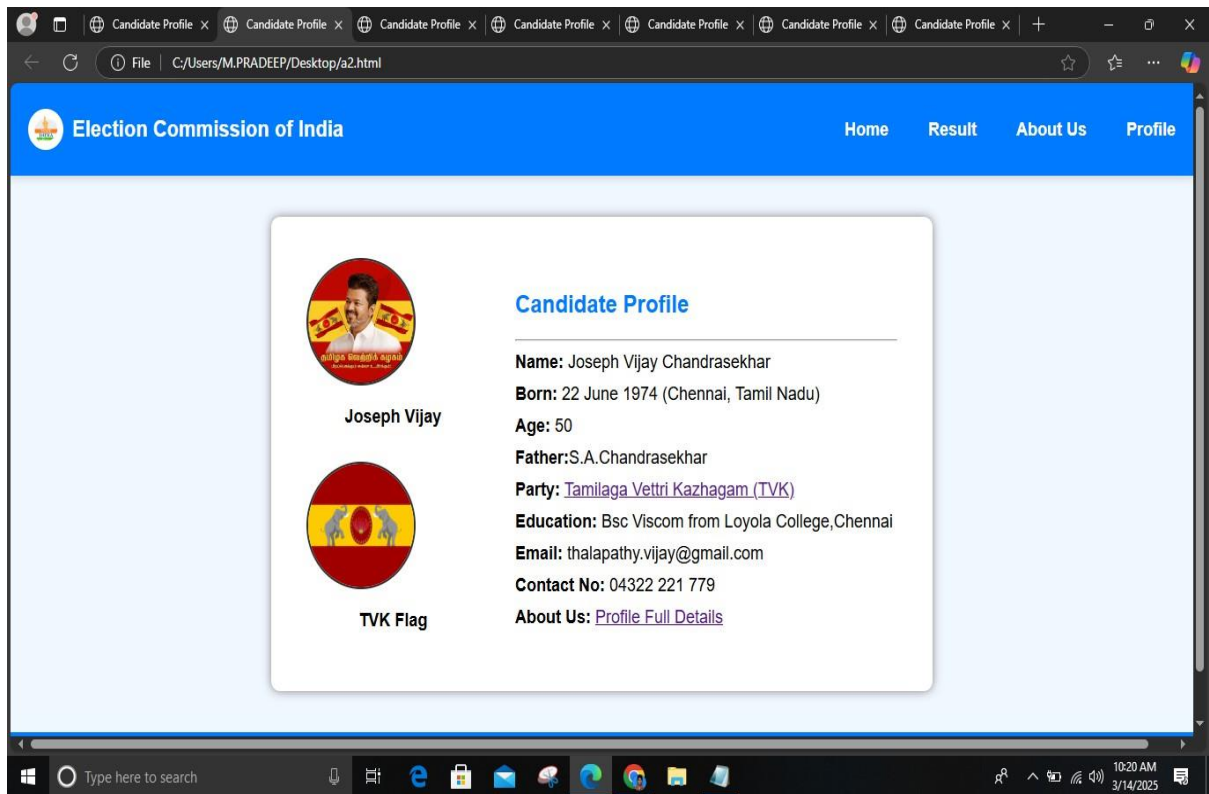Fig. 6.4.10 Candidate Information Page

Fig. 6.4.10 Candidate Information Page

# CHAPTER 7

# RESULT AND DISCUSSION

The E-Authentication Using OTP and QR for Online Voting System successfully enhances the security, integrity, and efficiency of digital elections by implementing multi-factor authentication (OTP & QR-based verification), real-time vote tracking, and intrusion detection mechanisms. The system ensures that only registered voters can access the platform and prevents unauthorized access attempts through its Intruder Capture & Alert System (ICAS).The QR-based voting mechanism ensures one-time vote casting, preventing multiple submissions from a single user. The system's real-time monitoring dashboard enables administrators to track voter participation, authentication logs, and voting trends, providing valuable insights into the election process. The ICAS module effectively prevents fraudulent login attempts by capturing the intruder's image after three failed OTP attempts and sending an email alert to the legitimate voter and the administrator. This feature deters unauthorized access and enhances overall election security.

Additionally, the admin module provides comprehensive control over the voting process, including candidate management, vote analytics, and election monitoring. The platform's automated email notifications keep voters informed about their registration, login attempts, and vote status, ensuring a transparent and accountable election process.

This system has successfully addressed major security concerns in online voting by integrating cryptographic security, biometric monitoring, and automated alerts, making it an effective and reliable digital voting solution.

# CHAPTER 8

# CONCLUSION

The E-Authentication Using OTP and QR Code for Online Voting System provides a robust and secure mechanism for online elections by integrating multi-factor authentication. By utilizing OTP verification and QR code-based authentication, the system ensures that only legitimate voters can access and cast their votes. This enhances electoral integrity and prevents unauthorized access or fraudulent voting attempts.

The one-time usable QR code mechanism ensures that votes remain confidential and tamper-proof, while real-time security monitoring, including camera access upon repeated failed login attempts, strengthens user verification. The PHP-MySQL backend effectively manages user data, vote tracking, and authentication processes, ensuring a seamless and transparent voting experience.

This system not only improves election security but also enhances voter convenience, making remote and online voting more accessible. Future enhancements could include biometric authentication, blockchain-based vote recording, and AI-driven fraud detection to further strengthen election integrity.

Thus, this project serves as a significant step toward secure, transparent, and accessible online voting systems, addressing modern electoral challenges with advanced technology.

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