A Mini Project Report

On

FCRIT's Online Voting System

Submitted in partial fulfilment of the requirement of

University of Mumbai

For the Degree of

Bachelor of Engineering (SE)

in

COMPUTER ENGINEERING

Submitted by

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APPROVAL SHEET

This is to certify that the Mini project entitled

"FCRIT's Online Voting System"

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Date:

Place:

Declaration

We declare that this written submission for S.E. Mini Project entitled "**FCRIT's Online Voting System**" represent our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declared that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any ideas / data / fact / source in our submission. We understand that any violation of the above will cause for disciplinary action by institute and also evoke penal action from the sources which have thus not been properly cited or from whom paper permission have not been taken when needed.

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Abstract

The project is mainly aimed at providing a secured and user-friendly Online Voting System for Elections held at college level, like Student Council Elections and Club Committee Elections. This system deals with the design and development of a web-based voting system using College Roll Number/User ID and Password in order to provide high performance with high security to the voting system. The proposed Online Voting System allows the students to enter their Roll Number, which is then matched with existing data within the database that is retrieved from the College Database. The system has two key modules: Admin, responsible for all aspects except voting, and User, with login and candidate information sub-modules. Secure login using college IDs and passwords ensures eligibility for participation in college elections. Access to candidate details aids informed voting decisions, enhancing the overall user experience. This voting system enhances participation with convenient, secure, and accessible voting from anywhere. It prevents fraud, saves time, minimizes human intervention, and offers user-friendly, efficient voting. Overall, it simplifies and secures the voting process.

Keywords: *Online Voting System, E-voting, PHP, MySQL, HTML, CSS, JavaScript*

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Chapter 1

Introduction

1.1 Background

The advent of the internet and digital technology presented an opportunity to address these issues. The development of online voting systems sought to provide a convenient, secure, and efficient platform for voters to cast their ballots remotely. This transition aimed to increase voter participation by making the process more accessible and accommodating. It also focused on ensuring the integrity and security of the electoral process, safeguarding voter privacy and preventing unauthorized access or manipulation. The development of Online Voting Systems is part of a broader trend toward digitization, automation, and improved governance in the modern era. These systems aim to align with democratic principles, enhance transparency, and adapt to the evolving needs of voters and institutions, creating a more inclusive and efficient electoral process.

1.2 Motivation

Traditional paper-based voting systems often encounter challenges such as low voter turnout, verification issues, and delays in result announcements. By developing an online voting system, we aim to address these issues and make the electoral process more convenient, secure, and inclusive. Our project's motivation lies in empowering students to actively participate in their governance by providing them with a user-friendly and accessible platform. Additionally, embracing modern technology not only improves the voting experience but also aligns with the digital age, fostering transparency, efficiency, and trust in our educational institution's democratic processes.

1.3 Aim and Objective

The primary objective of this endeavour is to transform the traditional election process by harnessing the capabilities of digital technology. By doing so, the project strives to boost voter engagement and turnout, ensuring that students can easily participate in the electoral process from anywhere. Moreover, the introduction of this intelligent voting system serves to eliminate fraudulent activities that can compromise the integrity of elections, promoting transparency and fairness. Through the incorporation of this innovative system, the overarching goals include streamlining the entire voting process, enhancing its efficiency, and providing a convenient and secure platform for voters. With the introduction of this technology, students can cast their ballots with ease, thereby elevating overall participation and engagement in the democratic processes of the college.

1.4 Report Outline

This report outlines our approach in improvising the existing system for college elections. Our project centers on the development of an online voting system tailored for college elections. It seeks to rectify the shortcomings of conventional paper-based voting methods by providing a secure and accessible platform for students to vote remotely. The system employs robust authentication through College Roll Number/User ID and Password, ensuring the integrity of the electoral process while safeguarding voter privacy. Administrator control is emphasized for nominee management, result declaration, and overall system flexibility. The project underscores the significance of security, privacy, scalability, and user feedback in creating a transparent and efficient online voting experience, ultimately enhancing college governance.

Chapter 2

Study Of the System

2.1 Literature Survey

Table 2.1: Research Papers Comparison

Sr. No.	Paper Title	Technology used	Security	Scalability
1.	Security and privacy in smart city: a secure e-voting system based on blockchain	Blockchain technology	√	✕
2.	Highly Secured Online Voting System over Network	Matlab, Fisherfaces	√	✕
3.	An Efficient Online Voting System	HTML, CSS, Java, MySQL	✕	√
4.	E-voting System Based on Ethereum Blockchain Technology Using Ganache and Remix Environments	Ganache, Truffle, NPM, metamask, Remix	√	✕
5.	Online Voting System	Fingerprint Scanner, PHP, SQL	√	✕

2.1.1 Security and privacy in smart city: A secure e-voting system based on blockchain - Fatima Zahrae Chentouf, Said Bouchkaren [1]

This survey delves into blockchain's role in smart cities, highlighting its features of transparency, democracy, decentralization, and security, which can enhance safety and efficiency in urban settings.

2.1.2 Highly Secured Online Voting System over Network - K. P. Kaliyamurthie, R. Udayakumar, D. Parameswari and S. N. Mugunthan [2]

The project's primary goal is to introduce an interactive online voting system in India, enabling eligible voters to cast their ballots remotely. Registered voters receive a unique ID from the IECI and an online registration ID, ensuring dual authentication for secure access.

2.1.3 An Efficient Online Voting System – Ankit Anand, Pallavi Divya [3]

Traditional voting systems have transformed from manual to electronic, offering benefits but also facing drawbacks like inefficiency, paperwork, and limited accessibility. Online Voting Systems overcome these challenges, ensuring secure and convenient voting from anywhere, enhancing participation and safety.

2.1.4 E-voting System Based on Ethereum Blockchain Technology Using Ganache and Remix Environments – Hind S. Hassan, Rehab Hassan, Ekhlas K. Gbashi [4]

A blockchain-based election system using smart contracts on Ethereum revolutionizes voting. It offers decentralized, speedy, cost-effective, and secure voting, surpassing limitations of centralized systems.

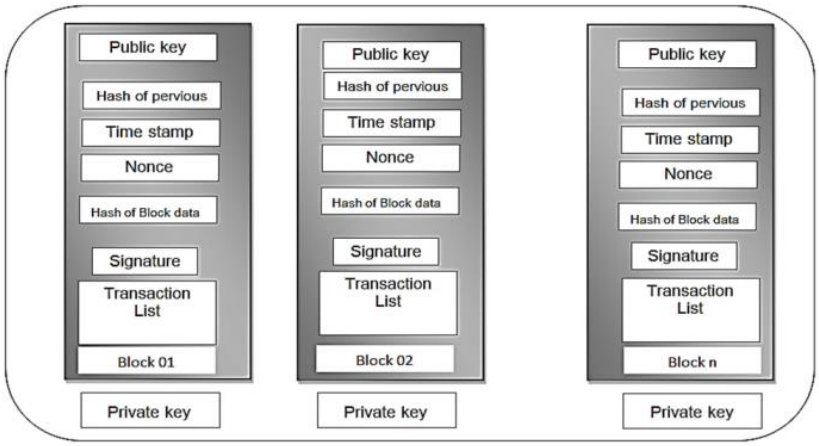

Figure 2.1: Ethereum Blockchain Structure

2.1.5 Online Voting System – Rajesh M. Ghadi, Priyanka S. Shelar [5]

Online voting enables secure, convenient, and nationwide participation, reducing the fear of violence and increasing voter turnout. It offers a secure and efficient way to capture and tally votes.

2.2 Existing System

Table 2.2: Existing Systems Comparison

Sr. No.	Paper Title	Technology used	Security	Scalability
1.	Electronic Voting Machine	Electronic Voting Machine	√	√
2.	Closed Envelope Ballot System	Ballot Box, Paper-pen	✗	✗
3.	Proxy Voting	Representative	√	✗

2.2.1 Electronic Voting Machine [6]

Electronic Voting Machines (EVMs) are used in several countries, such as India, for automated and efficient vote counting. While they expedite the process, EVMs have vulnerabilities, including hacking risks and the absence of transparent paper trails, which may impact the integrity of election results.

2.2.2 Closed Envelope Ballot System [7]

The "closed-envelope ballot system" prioritizes vote secrecy with sealed, blank ballots. However, it poses challenges in handling sealed envelopes, time-consuming processing, and the risk of damage to ballots or envelopes.

2.2.3 Proxy Voting [8]

Proxy voting permits delegation of voting authority but poses risks of abuse, conflicts, and privacy concerns, potentially undermining direct participation and transparency. Achieving a balance between convenience and openness is essential in designing effective proxy voting systems.

Chapter 3

Proposed System

3.1 Problem Statement

Traditional paper-based college elections suffer from issues such as low turnout, identity verification challenges, manipulation risks, and result delays. Our college faces these problems, resulting in inconvenience and reduced participation. To tackle these issues, we propose an online voting system. It offers a convenient, secure, and efficient platform for remote voting, preserving electoral integrity. Digitization aims to boost participation, enhance accuracy, and expedite result announcements.

3.2 Scope

The online voting system for college elections project is a multifaceted endeavor with a clear focus on efficiency and security. It encompasses critical components, starting with Voter Registration and Authentication, ensuring a robust and secure system for voter registration and verifying the legitimacy of each voter. The creation and management of election Ballots is streamlined through an administrative interface, while a user-friendly Voting Interface empowers students to securely cast their votes and make adjustments as needed. Real-time Results and Reporting guarantee the accurate and anonymous display of results, and utmost priority is given to Security and Data Privacy to protect the system from unauthorized access and data tampering.

In addition to these core elements, the project incorporates User Support and Training to facilitate seamless user navigation, Scalability and Performance planning for peak election periods, and an essential Feedback and Iteration process that encourages user feedback after each election cycle, driving continuous improvement and evolution of the system to meet the dynamic requirements of the college community. This comprehensive approach ensures a robust and user-centric online voting system that meets the demands of college elections effectively.

3.3 Hardware Requirements

i. For Candidate Documentation: Scanner, camera, etc.
ii. Voting device for user: smartphones, laptops, PCs, etc.
iii. Reliable server infrastructure.

3.4 Software Requirements

i. A strong and reliable network connection.
ii. College Database of Students for authentication.
iii. Frontend Technologies: HTML, CSS, JavaScript
iv. Backend Technologies:
    Database Management: MySQL
    Scripting Language: PHP
v. Server (for testing): XAMPP
vi. Integrated Development Environment (IDE): Visual Studio Code

Chapter 4

Design of the System

4.1 Approach

4.1.1 System work flow for Voter

The voter module within the Online Voting System for college elections is a cornerstone of convenience, security, and transparency. It offers a meticulously designed workflow to ensure that eligible students can cast their votes easily and securely from any location. The process begins with user registration, where students login with their Roll Numbers. Dual authentication, involving the User ID and password, enhances the system's security.

Once logged in, voters can access the relevant election ballot and view candidate profiles, fostering an informed electorate. They can cast their votes securely, with the flexibility to modify their choices before submission. Stringent security measures safeguard user data, ensuring the integrity of the voting process. Real-time vote tallying provides instant results, enhancing transparency and trust.

The system prioritizes convenience, enabling students to participate without visiting physically, thus increasing voter turnout and safety. The security measures protect voter privacy, reducing the potential for coercion or intimidation. The automated tallying process ensures quick and accurate results, eliminating delays and uncertainty.

In summary, the voter module's workflow empowers students to engage in college elections with ease, security, and transparency. It revolutionizes the electoral experience, making it more accessible and inclusive while preserving the integrity of the voting process. This module is instrumental in advancing the democratic processes within the academic community.

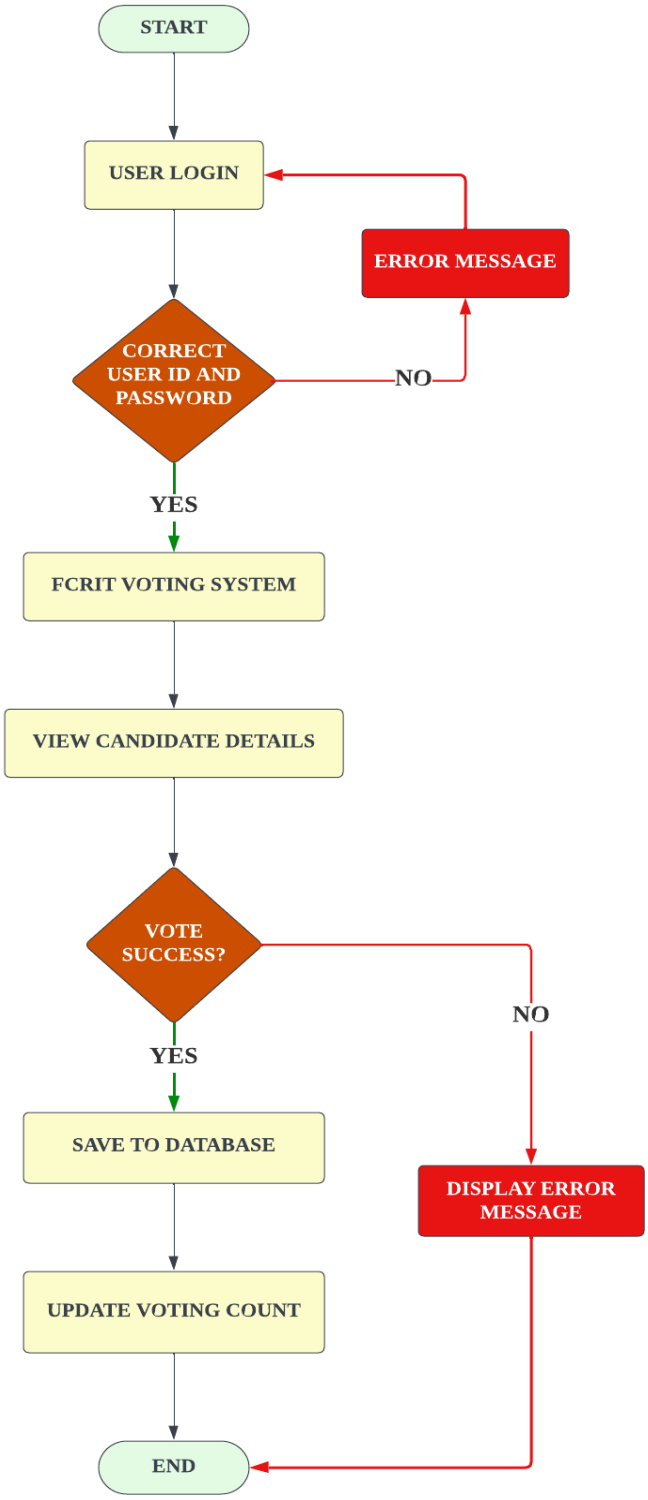

Figure 4.1: Voter Login Flowchart

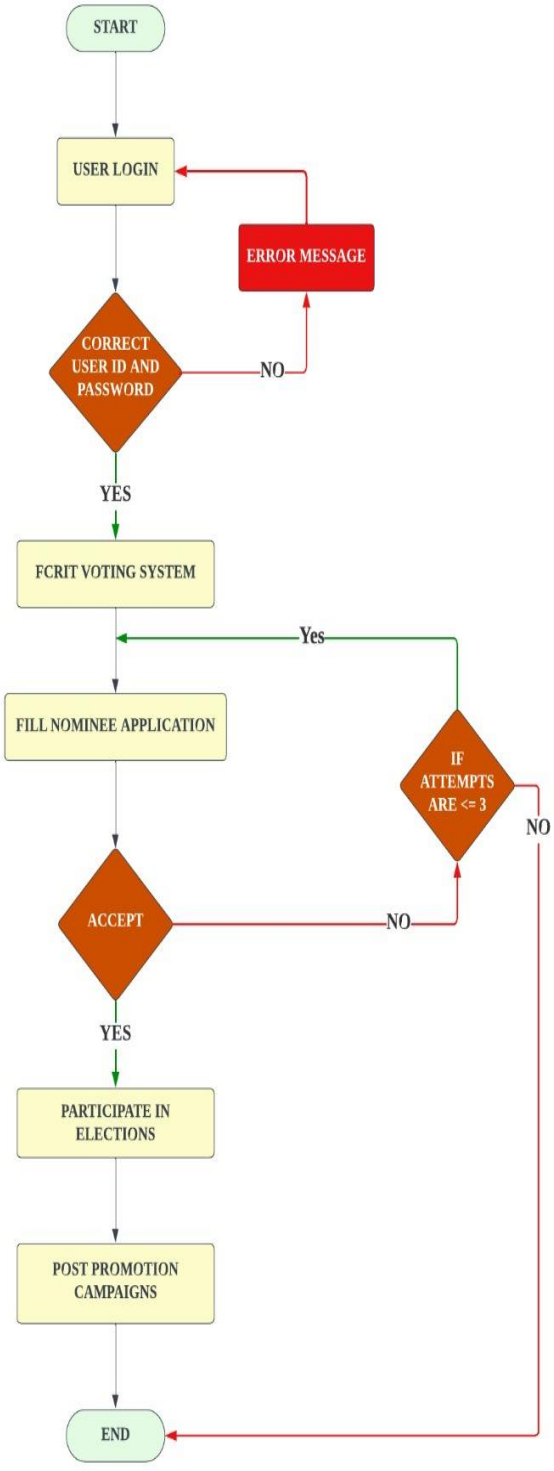

Figure 4.2: Candidate Flowchart

4.2 System Architecture

4.2.1 Block Diagram of the System

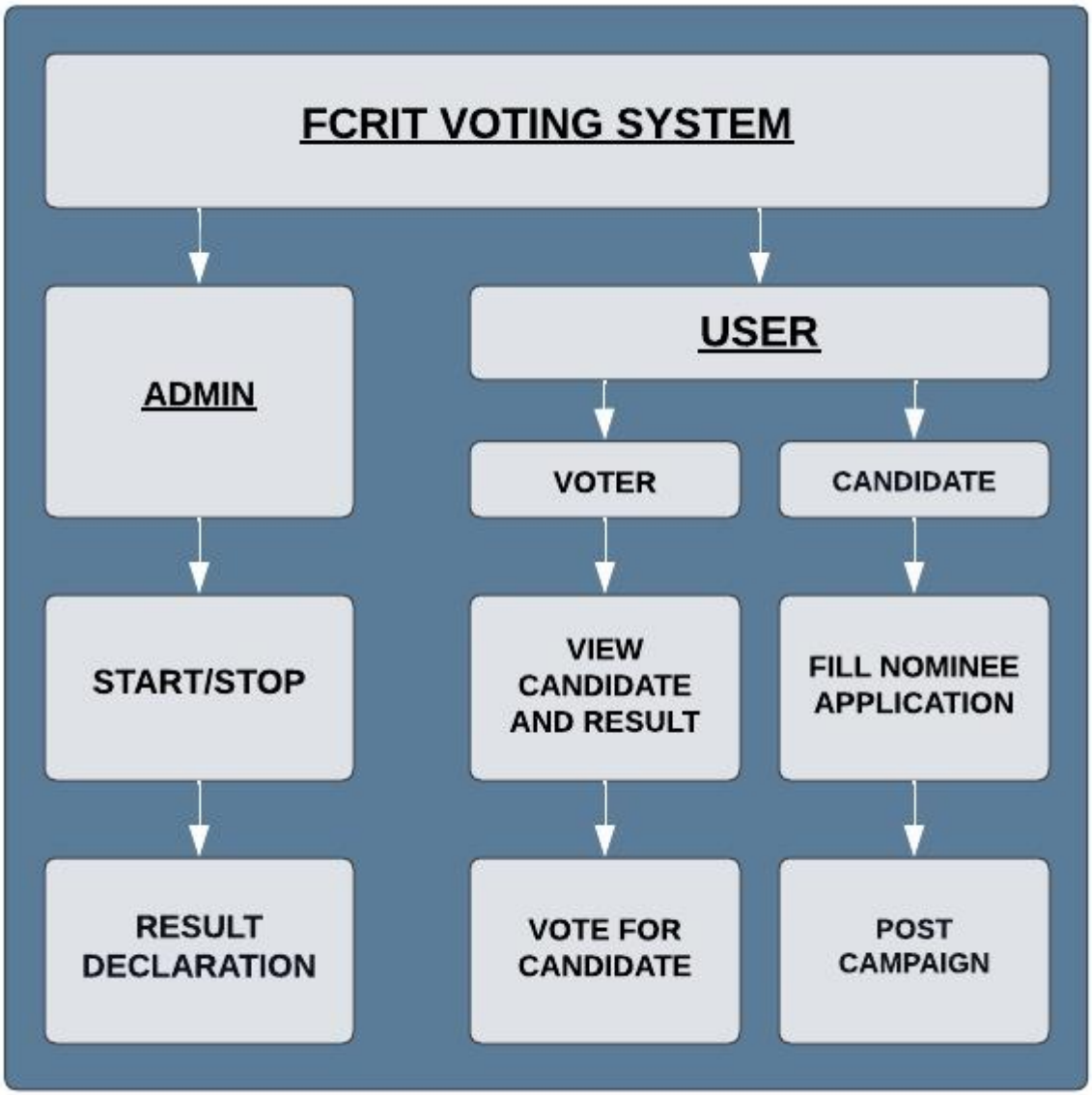

Figure 4.3: Voting System Block Diagram

4.3 System Modules

4.3.1 The Administrator Module

The Administrator in the Online Voting System holds a pivotal role, controlling all system aspects except actual voting. They manage nominee profiles, preserving candidate pool integrity, ensuring system flexibility to adapt to changes, and maintaining nominee access security. The administrator plays a crucial role in officially announcing and declaring final voting results, ensuring transparency and credibility. Their control over system components and result declaration is fundamental in promoting a fair, efficient, and secure online voting experience for all users.

4.3.2 The Voter Module

The module comprises three essential components:

Login Page: This section enforces dual authentication through college-issued credentials, ensuring secure access only for eligible voters (students and teachers). This approach safeguards against impersonation, maintains system integrity, and upholds trust.

Candidate Details: Here, voters access comprehensive candidate information, including names, photos, affiliations, and platforms. This transparency empowers informed choices based on candidate qualities, fostering an engaged and educated electorate.

View Results: The automated and secure process of tallying and verifying votes culminates in transparently communicated outcomes, reflecting the voters' will.

Chapter 5

Result and Discussion

5.1 Working of the Voting System

5.1.1 Login Page

The Administrator and Voters/users login to this system through this page by entering their login their User ID and Password which is already given to them.

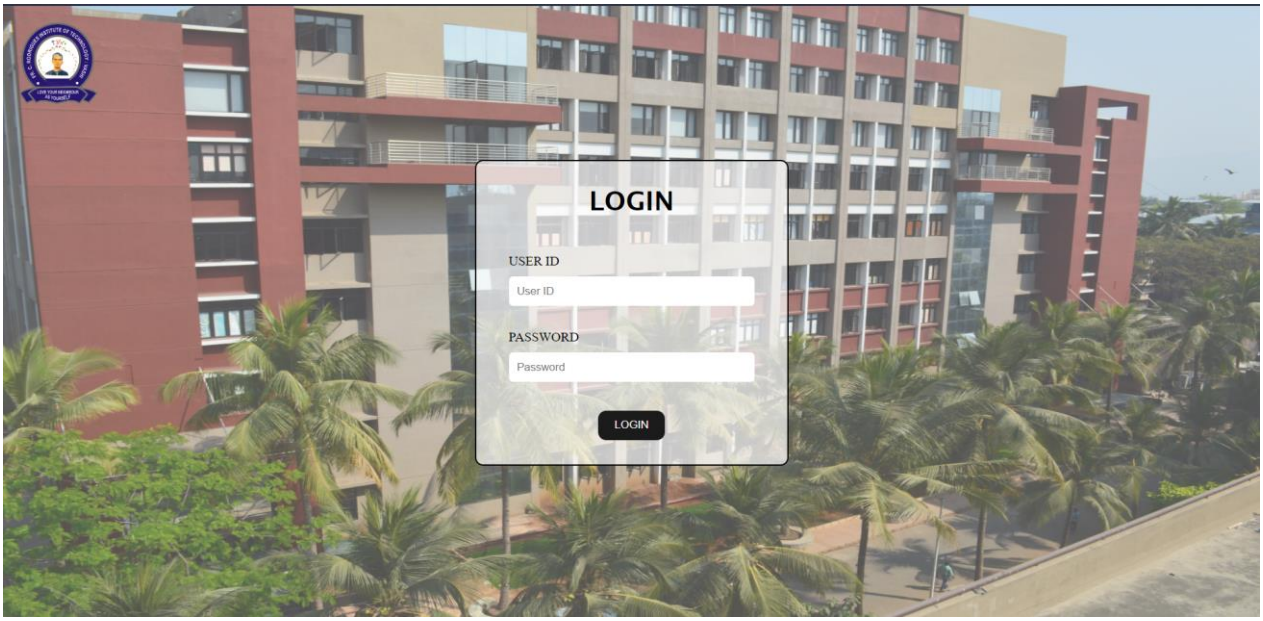

Figure 5.1: Login Page

5.1.2 Administrator Dashboard

The Administrator controls the major aspects of voting, that is accepting and rejecting candidates. Start/Stop the voting process and finally declaring the election results.

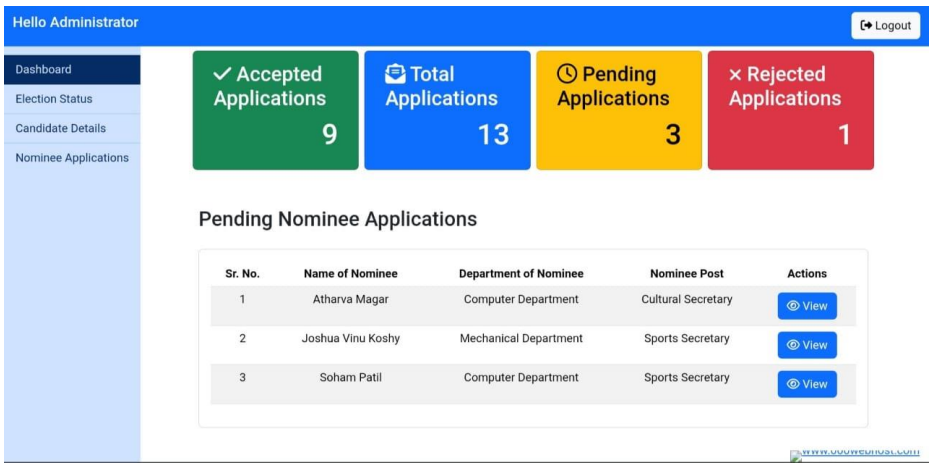

Figure 5.2: Administrator Login

5.1.3 Candidate Application Process

Users submit candidacy details; admins review, approve, or reject applications; facilitates communication and feedback.

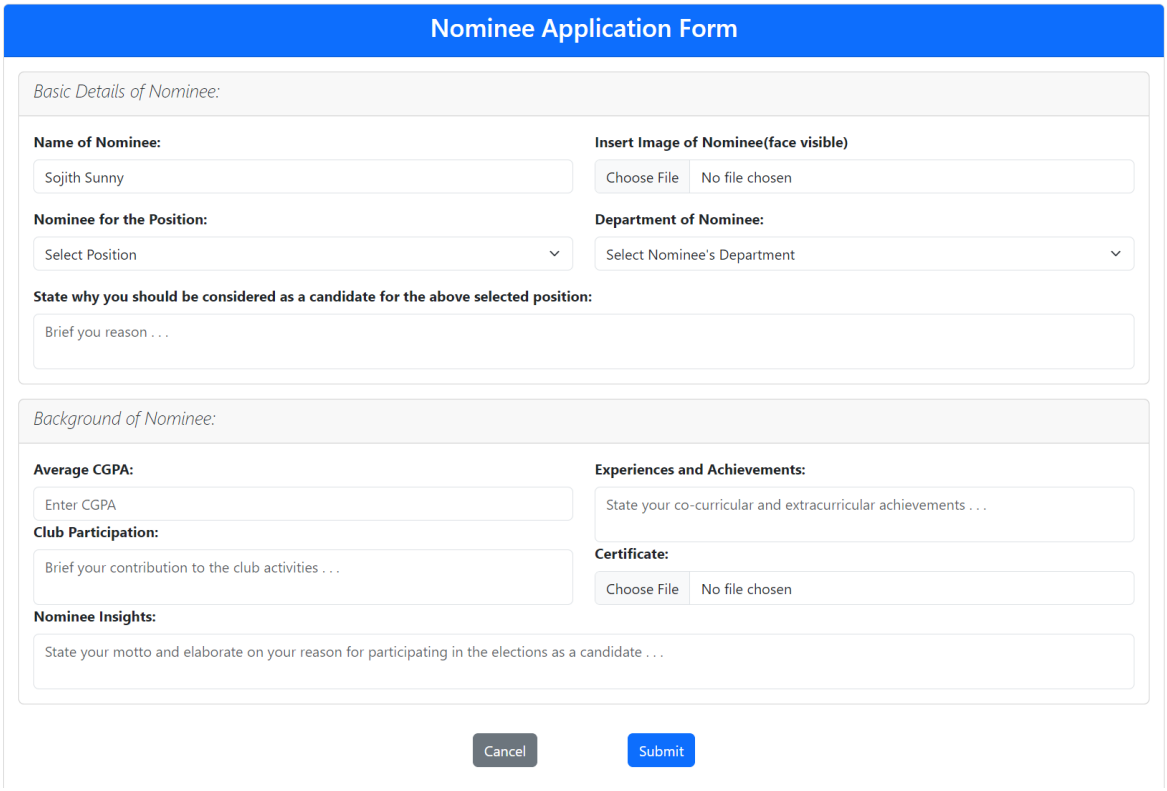

Figure 5.3: Add New Candidate Page

5.1.4 Voter's Dashboard

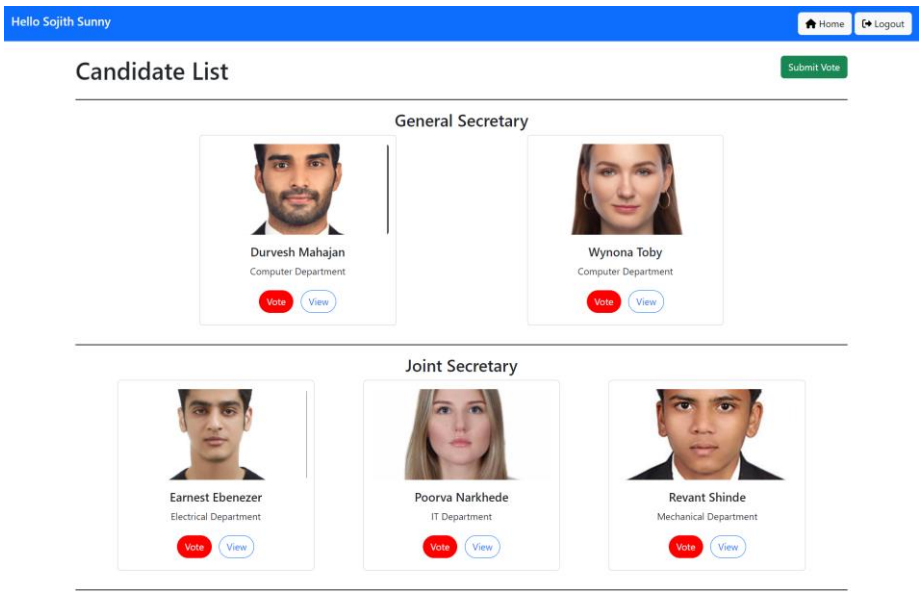

Figure 5.4: Voter Login

5.2 Vital Code Segments

5.2.1 Authentication System

```
function validate($data) {
   $data = trim($data);
   $data = stripslashes($data);
   $data = htmlspecialchars($data, ENT_QUOTES);
   return $data;
}
$uid = validate($_POST["userid"]);
$pwd = validate($_POST["password"]);

if (empty($uid)) {
   header("Location: login.php?error=User ID Required.");
   exit();
} else if (empty($pwd)) {
   header("Location: login.php?error=Password Required.");
   exit();
} else {
   $sql = "SELECT * FROM login WHERE id='$uid' AND pw='$pwd'";

   $result = mysqli_query($conn, $sql);
   if (mysqli_num_rows($result) == 1) {
      $row = mysqli_fetch_assoc($result);

      if ($row['id'] == 'admin' && $row['pw'] == 'admin') {
         header("Location: admin.php");
         exit();
      }
      if ($row['id'] == $uid && $row['pw'] == $pwd) {
         $_SESSION['name'] = $row['name'];
         $_SESSION['id'] = $row['id'];
         header("Location: user.php");
         exit();
      } else {
         header("Location: login.php?error=Incorrect User ID or Password.");
         exit();
      }
   } else {
      header("Location: login.php?error=Incorrect User ID or Password.");
      exit();
   }
}
```

5.2.2 Candidate Application Status

```
$query = "UPDATE candidates SET status=?, attempts=?, comments=? WHERE name=?";
$stmt = mysqli_prepare($conn, $query);

if ($stmt) {
    mysqli_stmt_bind_param($stmt, "siss", $status, $attempts, $comments, $name);
    $query_run = mysqli_stmt_execute($stmt);

    if ($query_run) {
        echo "Operation Successful: $status";
        header("Location:../admin/admin.php#applications");
        $_SESSION['message']="$name's application has been $status!";
    } else {
        echo "Error: " . mysqli_error($conn);
    }
    mysqli_stmt_close($stmt);
```

5.2.3 Add Votes

```
foreach ($_POST as $key => $value) {

    if ($key != 'submitVote') {

        $query = "UPDATE candidates SET voteCount = voteCount + 1 WHERE id = ?";

        $stmt = mysqli_prepare($conn, $query);

        mysqli_stmt_bind_param($stmt, 's', $value);

        $result = mysqli_stmt_execute($stmt);
```

Chapter 6

Conclusion

6.1 Conclusion

The primary objective of the Online Voting System is to provide a user-friendly and easily accessible platform for voters to exercise their democratic right through the internet. In addition to enabling remote voting, this system significantly streamlines the vote counting process by harnessing the efficiency of database queries. Our system boasts seven pivotal characteristics that are fundamental to a robust Online Voting System. These include convenience, making it effortless for voters to participate; verifiability, ensuring the integrity of the electoral process; flexibility, adapting to varying election requirements; democracy, upholding the principles of fair representation; mobility, allowing voters to cast their ballots from anywhere; privacy, safeguarding voter data; and social acceptance, fostering trust and credibility. These attributes lay the foundation for the system's development, encompassing its analysis, design, implementation, and ongoing maintenance, ensuring that it aligns with the highest standards and stands ready to meet the diverse needs of voters and the democratic process alike.

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[6] "Electronic Voting Machines"

[7] "Closed Envelope Ballot Voting"

[8] "Proxy Voting"

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Appendix A: Timeline Chart

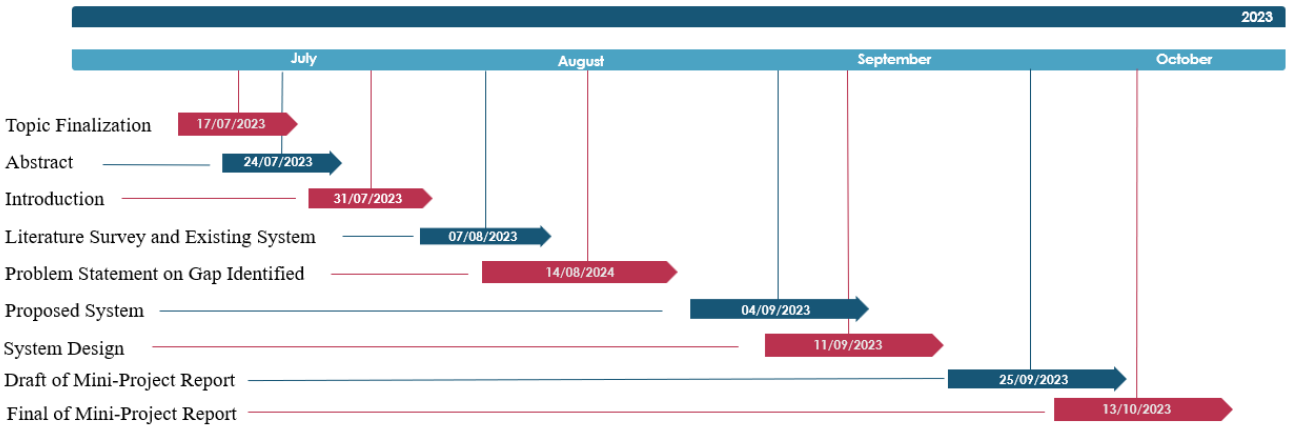

Figure 6.1: Timeline Chart (Semester 3)

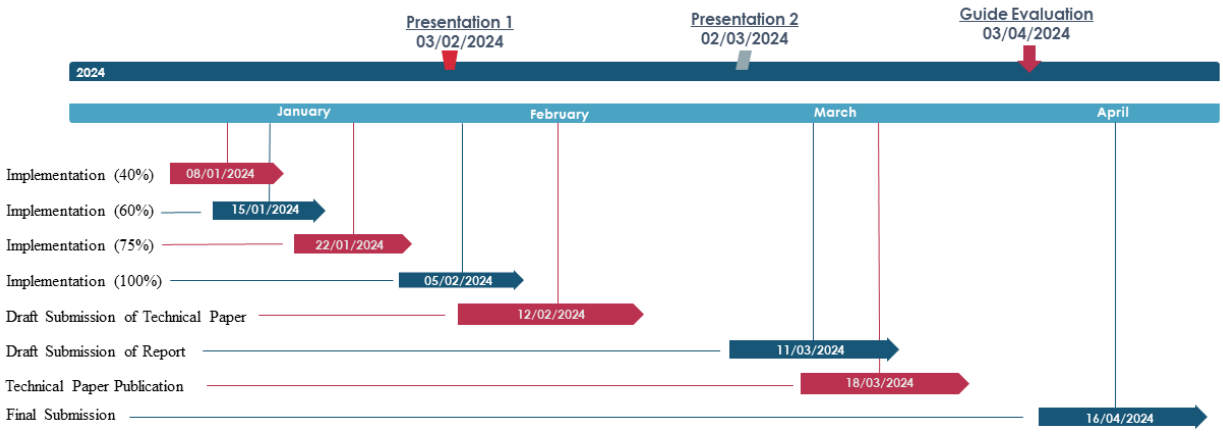

Figure 6.2: Timeline Chart (Semester 4)

Appendix B: Publication Details