

Online Voting System Based On QR Code

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Abstract: *Traditional voting systems require physical presence, rely on manual verification, and often involve long waiting times and slow counting processes, leading to potential errors and high operational costs. To address these limitations, this research proposes an Online Voting System that uses encrypted QR-code authentication. Each voter receives an exclusive QR code that verifies identity before ballot access, preventing impersonation and unauthorized voting. The system automates vote casting and counting while maintaining voter privacy and result integrity. This approach provides a secure, transparent, and efficient alternative suitable for modern elections.*

Keywords: Online Voting, QR Authentication, Secure Voting, E-Voting System, Encryption, Web-Based Voting

I. INTRODUCTION

Voting enables individuals to elect representatives and shapes government decisions. Conventionally, elections use paper ballots at specific polling locations, requiring voters to be physically present. Although widely adopted, this method faces challenges such as long queues, delays in verification, manual counting errors, logistical complexity, and risks of fraud or tampering. These issues discourage participation, especially among elderly citizens, those with disabilities, remote populations, and voters who are unable to travel on election day.

With rapid advancements in digital technology, governments and institutions are exploring online voting solutions to make elections more accessible, secure, and reliable. However, existing e-voting systems frequently lack strong authentication mechanisms and may be susceptible to privacy breaches and manipulation. Therefore, there is a crucial need for a secure and robust verification system to maintain fairness and accuracy.

1.1 NEED FOR SYSTEM

The current voting procedure struggles with:

- Long waiting lines at polling stations
- High workload and staffing demands
- Human-based counting errors
- Risks of duplicate or fraudulent voting
- Difficulty in participation for remote or incapacitated voters

1.2 Problem Statement

Existing voting processes are slow, inefficient, and vulnerable to fraudulent practices, and remote voters face accessibility barriers. Many online systems fail to ensure strong identity verification. The aim is to build a secure online voting system with QR-code-based authentication to enable one-time secure voting while preventing impersonation or unauthorized access.

1.3 SCOPE OF SYSTEM

The proposed platform provides a secure and transparent online voting environment enabled through QR-code verification.

The system will:

- Authenticate users using unique encrypted QR codes



- Allow eligible voters to submit ballots online
- Prevent multiple submissions from the same voter
- Encrypt votes and store them securely
- Display real-time or final results
- Protect voter identity and maintain data integrity
- Support remote participation

1.4 Literature Review

Research in digital voting has grown significantly due to advancements in information and communication technologies. Traditional voting methods frequently experience issues such as ballot tampering, verification delays, human mistakes, and inefficient logistics, reducing voter confidence and participation rates. Many studies emphasize the need for secure electronic voting systems that uphold transparency, privacy, accuracy, and accessibility.

Authentication remains a major research focus to prevent identity theft and illegal voting attempts. Shahzad and Crowcroft (2019) highlight the importance of enhanced verification using cryptographic technologies. Karunathi Lake (2020) suggests multi-factor authentication using OTPs, passwords, and encrypted tokens to increase system reliability and security.

1.5 Methodology

The methodology defines the structured development process for the QR-based Online Voting System. It integrates secure authentication, user-friendly interfaces, encrypted QR technology, OTP verification, and automated vote processing to support a reliable and tamper-proof voting experience.

The development phases include:

- System planning
- Requirement analysis
- System design
- Implementation
- Testing
- Deployment and evaluation

1.7 Software Requirements

Software	Hardware
HTML, CSS, Java, PHP / Python	QR Scanner / Smartphone
MySQL / Firebase	Stable Internet
Android or Web Application	Server



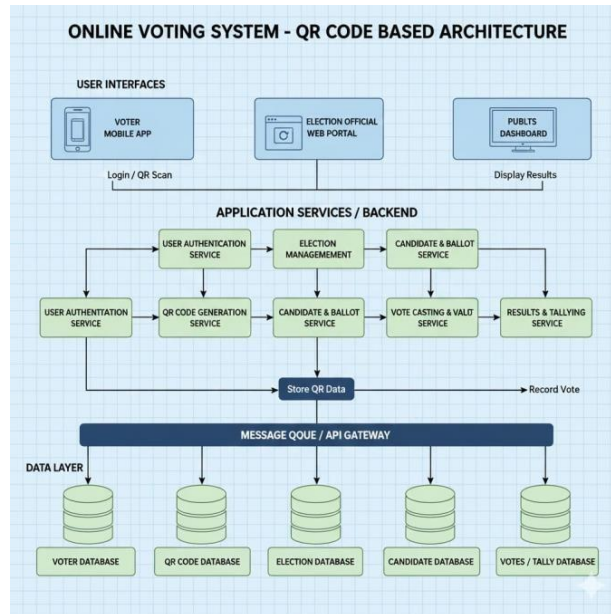


Figure:- System Architecture

1.7 CONCLUSION

The proposed QR-based Online Voting System offers a secure, transparent, and fraud-resistant solution for conducting elections. It minimizes manual involvement, simplifies participation, and supports remote voters. By combining QR-code authentication with encrypted vote handling, the system improves accuracy and credibility. Future enhancements such as blockchain or biometric verification could provide even stronger security.

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