

Online Voting System Using Face Recognition and OTP

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Abstract - The basic idea of this system is to create an Online Voting System that will help to suppress deception of the manual voting system and the prior versions of online voting by camera for Face Recognition and OTP generation. We are also implementing a location free voting system for the voters for whom it is not possible to come to the voting location (hometown). Here we propose a system that includes multiple layers of verification to ensure the reliability of the device which includes face verification and then OTP verification with validation data. Each voter can access the system only when being recognized and checked with the given database of enlist voters. Once the corresponding face is matched with the information provided, the voter will be allowed to proceed to choose their preferred candidate from the panel.

Key Words: Machine Learning, Python, Voting System, Face Recognition, MySQL, OTP, Location free Voting

1.INTRODUCTION

In the quest to modernize and secure the electoral process, the Online Voting System, powered by Python, emerges as a groundbreaking solution. This system

integrates biometric facial recognition and One-Time Password (OTP) authentication to elevate the precision, trustworthiness, and accessibility of elections. Python's adaptability and robust libraries make it the ideal framework for crafting this advanced voting system. Conventional voting methods often grapple with challenges such as identity fraud, intricate procedures, and delays in result compilation. Within the realm of Electronic Voting (E-Voting), this system harnesses technology to tackle these issues, empowering citizens to cast their votes securely and conveniently, all while upholding the transparency of the electoral process. Crucially, machine learning assumes a pivotal role in this innovative system, bolstering security, accuracy, and efficiency through data-driven methodologies.

Electronic voting technology intends to speed the counting of ballots, reduce the cost of paying staff to count votes manually and can provide improved accessibility for disabled voters. Also in the long term, expenses are expected to decrease. Results can be reported and published faster. Voters need to register on the online voting platform by providing their personal information, including their name, address, and a government-issued ID. Additionally, they would be required to set up their biometric data and link their

mobile phone numbers for OTP authentication. The advent of digital technology has revolutionized various aspects of our lives, including the way we conduct elections and voting processes. Traditional voting methods, such as paper ballots, can be cumbersome, time-consuming, and prone to errors. To address these issues and enhance the efficiency and security of voting, an Online Voting System using Face Recognition and One-Time Password (OTP) authentication has been developed.

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In the domain of elections, a comprehensive understanding of electoral processes and voting regulations is vital. Python expertise encompasses a thorough knowledge of election laws, voting procedures, and compliance requirements. It is essential to be well-versed in election management, which includes coordinating logistical aspects of elections, voter registration, and ballot preparation. This domain knowledge provides the foundation for creating a secure, efficient, and legally compliant online voting system that aligns with the established rules and regulations governing the electoral process. Within the subdomain machine learning of data security and encryption, expertise in safeguarding sensitive information is paramount. Subdomain knowledge involves implementing robust encryption methods to protect

voter data and ensure the confidentiality and integrity of the electoral process. This encompasses securing data transmission between the user and the server and safeguarding the storage of critical voting information.

The motivation behind this project stems from the need to modernize India's democratic practices. By transitioning from manual, resource intensive voting to an advanced online system with biometric authentication, we aim to make voting more accessible, efficient, and transparent for every citizen, fostering a stronger and more inclusive democratic framework.

1.1 PROBLEM STATEMENT

Considering the recent COVID-19 pandemic, it has become evident that the current voting system carries inherent risks. The necessity for physical presence during the voting process can undermine social distancing measures, posing a potential threat to public health and safety. Current manual voting systems are fraught with issues such as identity fraud, limited accessibility, the potential for multiple votes by a single individual, and constraints tied to physical polling locations. To address these challenges and revolutionize the voting process, this project aims to develop an Online Voting System that combines facial recognition, OTP authentication, and location-free voting.

1.2. LITERATURE REVIEW

1) Biometrically Secured Electronic Voting Machine

In this research paper [1], an innovative approach is adopted by utilizing Arduino in conjunction with a fingerprint scanner to establish a voting system. This system not only ensures the identification of each voter but also effectively tallies the votes while safeguarding against fraudulent voting. The fingerprint scanner plays

a pivotal role in voter identification, efficiently discerning whether an individual is a registered voter or not. Additionally, it is designed to prevent a voter from casting multiple votes, thus enhancing the integrity of the electoral process. This system presents a practical and secure solution to modernize the voting experience.

Advantage: Implementing an Arduino and fingerprint scanner system enhances security, prevents fraudulent voting, and automates the process

Disadvantage: High setup costs, privacy concerns, potential technical issues, and may not accommodate individuals without fingerprints.

2) Online Voting System Using Cloud

In this paper [2], the system leverages the capabilities of the cloud to provide a digital audit trail, enhancing transparency and traceability. It not only addresses the issues associated with manual voting, including potential malpractices, but also offers a scalable and secure platform for citizens to exercise their voting rights conveniently. By shifting the voting process to the cloud, this system aims to bolster the integrity of elections, improve accessibility, and ensure the accuracy and reliability of the voting process.

Advantage: Cloud-based online voting systems enhance transparency and accessibility, providing a digital audit trail for secure and convenient voting.

Disadvantage: However, they must address privacy concerns, cybersecurity threats, and the digital divide to ensure broad and equitable participation.

3) Analysis of the traditional voting system and transition to the online voting system in the republic of Iraq

The paper [3], analyzes the existing voting system in the Republic of Iraq and explores the main problems

associated with its functioning. A comprehensive analysis of the traditional paper-based voting system in the Republic of Iraq is done, highlighting its historical challenges such as security concerns, logistical complexities, and accessibility issues. The discussion about the potential benefits of transitioning to an online voting system, including enhanced security features, accessibility improvements, and cost-efficiency is observed.

Advantages: Paper ballots can be physically stored and recounted in case of disputes or recounts.

Disadvantages: Manual counting can lead to errors in tallying votes, potentially affecting the accuracy of the results.

4) Enhanced Electronic Voting Machine Performance with an E-Voting Website

This paper [4], presents enhanced voting machine performance with an E-Voting website. The EVM is built using Raspberry pi 3 model B+. A web cam is used for face recognition and a fingerprint device is used for biometric authentication to ensure the right voters as per the record. This dual-layer authentication ensures that only eligible and verified voters can cast their ballots, significantly reducing the risk of fraudulent voting.

Advantage: Integrating Raspberry Pi-based EVM with biometric authentication via webcam and fingerprint device enhances security and accessibility in voting.

Disadvantage: However, the reliance on technology introduces potential technical issues, and ensuring universal access to these technologies may be a challenge.

5) Decentralized E-Voting Portal Using Blockchain

In this paper [5], blockchain frameworks for the E-voting system are introduced, offering a solution suitable for small scale elections, The implementation relies on Ethereum smart contracts and combines blockchain technology with homomorphic encryption and secret sharing schemes to create a decentralized voting system.

Advantage: Protection to the data privacy, transmission and ballots verification during the phase of billing is provided.

Disadvantage: Internet and blockchain-based voting systems can have security risks.

2. Proposed Solution

Our proposed system introduces an innovative and secure approach to change the electoral process, offering a seamless Online Voting System integrated with cutting-edge face recognition and OTP authentication. This forward-looking system not only addresses the limitations of traditional offline manual voting but also ensures transparency, trustworthiness, and user-friendliness. By incorporating biometric face verification, users can confidently authenticate their identity, while OTPs further bolster security. The system caters to diverse voter preferences, enabling remote "location-free" voting.

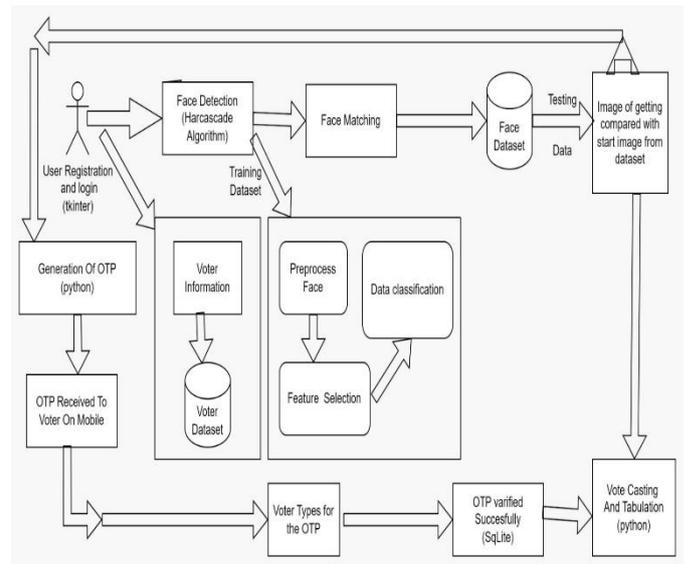


Fig. 1: System Architecture

3. CONCLUSION

Our innovative solution is machine learning-powered, integrating facial recognition for voter registration and enabling voting from any location. This system prioritizes security and mitigates the risk of multiple votes from a single person, enhancing reliability. Furthermore, it not only supports voting from diverse locations but also streamlines the process, reducing the workload, human dependencies, cost and time resources. The project aims to pioneer a more accessible, transparent, and efficient electoral future for India.

4. FUTURE SCOPE

The future scope of an online voting system with face recognition and OTP authentication is promising, with opportunities for wider adoption, enhanced security, mobile application development, data analytics, and global use. Additionally, improving accessibility features, user experience, educational campaigns, legislative changes, and continuous research are critical. Cross-platform compatibility, multilingual support,

blockchain voting tokens, and integration with government services can further enhance the system. The key is to remain adaptable to technological advancements and responsive to the evolving needs of the democratic process.

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