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SMART VOTING SYSTEM USING FACE RECOGNITION

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Abstract:

The Smart Voting System using Face recognition using Aadhaar-based authentication is a voting system that aims to ensure the accuracy and integrity of the election process by using facial recognition technology and Aadhaar-based authentication to identify and authenticate voters. Aadhaar is a unique identification number issued by the Indian government to its citizens.

The system works by capturing the facial features of voters and comparing them to a database of registered voters, which is linked to their Aadhaar number. Once the voter's identity is confirmed, they are allowed to cast their vote. This system also provides real-time monitoring of the voting process and generates detailed reports on voter turnout and election results. The Smart Voting System using Face Recognition using Aadhaar-based authentication is a promising solution that can help prevent fraudulent voting, enhance the transparency and efficiency of the voting process, and promote democratic values and principles.

Keywords: Smart Voting System, Face Recognition, Aadhaar, Authentication, Identification, Voter, Fraud Prevention, Transparency, Efficiency, Democratic Values.

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1.INTRODUCTION

The Smart Voting System using Face Recognition is a technological innovation that aims to ensure the accuracy and integrity of the election process by using facial recognition technology to identify and authenticate voters. The traditional voting system has always been susceptible to various fraudulent activities such as impersonation, ballot stuffing, and manipulation of votes. To address these challenges, the Smart Voting System using Face Recognition offers a more reliable and efficient way to conduct elections. This system works by capturing the facial features of voters and comparing them to a database of registered voters to verify their identity. Once the voter's identity is confirmed, they can cast their vote. The system also provides real-time monitoring of the voting process and generates detailed reports on voter turnout and election results. The Smart Voting System using Face Recognition is a promising solution that can enhance the transparency and efficiency of the voting process, thus promoting democratic values and principles. In this system, the use of facial recognition technology and Aadhaar-based authentication ensures a higher level of

security and reliability, making it an ideal solution for conducting fair and transparent elections.

2 METHODOLOGY

2.1 Introduction

A smart voting system using face recognition methodology is a modern approach to conducting elections that leverages cutting-edge technology to ensure accurate and secure results. This system is designed to overcome traditional voting challenges, such as identity verification, security, and reliability, by utilizing advanced facial recognition technology. The system works by capturing the image of the voter's face using a web camera, which is then matched with a database of registered voters. This process ensures that only authorized voters can participate in the election, preventing fraud and manipulation In addition to the web camera, the system includes a microcontroller that manages the interactions between the hardware components and processes the data collected from the camera. A switch is used to initiate the voting process, while a buzzer indicates the completion of the process. An LCD display is used to show the results of the vote, providing instant feedback to the voters. Overall, a smart voting system using face recognition methodology ensures an efficient, secure, and accurate voting process. It has the potential to transform the way we conduct elections, making them more accessible and trustworthy for citizens.

2.2 Hardware:

The Hardware of a smart voting system using face recognition includes a microcontroller, power supply, switch, buzzer, LCD display, and web camera. The microcontroller manages the interactions between the components while the power supply provides the necessary voltage and current. The switch initiates the voting process and the buzzer indicates its completion. The LCD display shows the results of the vote. The web camera captures the voter's face, which is then matched with a database using advanced face recognition algorithms to verify the voter's identity. Together, these hardware components ensure an accurate and secure voting process using cutting-edge technology.

2.2.1 Block diagram:

A smart voting system using face recognition consists of various components including a power supply, Arduino Uno, switch, buzzer, LCD, and web camera. The power supply is responsible for providing the necessary voltage and current to the system. The Arduino Uno is the main controller that interacts with the other components and processes the data received from the web camera. The switch is used to initiate the voting process, while the buzzer is used to indicate the completion of the process. The LCD is used to display the results of the vote. The web camera captures the image of the voter's face, and the face recognition algorithm compares it with the database to verify the
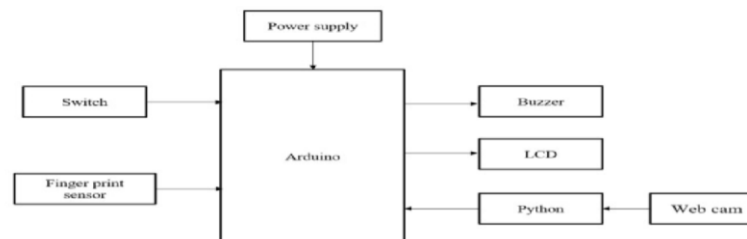
identity of the voter. Overall, this system ensures a secure and efficient voting process by using advanced face recognition technology.

Figure 2.1 Block diagram of Smart voting system

2.3 Software:

The application to be executed on above mentioned hardware. The Arduino uno is the main programmable device. To upload program on Arduino the Arduino IDE is used. So, the application has been written by using embedded C language and uploaded into the Arduino uno by using the Arduino IDE.

2.4 Algorithm:

1) **Voter registration:** The system captures personal information, including name and address, and a clear image of the voter's face, which is stored in a secure database.
2) **Face detection:** The system uses face detection algorithms to locate and extract the face region from the captured image.
3) **Feature extraction:** The system extracts facial features from the detected face region, such as distance between eyes, nose and mouth, and facial landmarks.

4) **Face matching:** The system compares the extracted facial features of the captured image with the registered voter's facial features in the database to authenticate the voter's identity.
5) **Vote processing:** Once the voter's identity is verified, they can cast their vote using a switch. The system records and processes the vote.
6) **Results calculation:** The system calculates the results based on the votes cast and displays them on the LCD display.
7) **System shutdown:** Once the voting process is complete, the system shuts down to ensure the security of the stored data.

Overall, these software algorithms ensure the accurate and secure operation of a smart voting system using face recognition. The algorithms utilize advanced facial recognition techniques to provide a reliable and efficient voting process.

2.5 Advantages of the proposed work
- Improved accuracy in voter identification and vote counting
- Increased efficiency in the voting process
- Reduced risk of fraud and manipulation
- Enhanced security and transparency in the voting process
- Simplified and streamlined voter registration and check-in process
- Reduced administrative workload for election officials
- Improved accessibility for voters with disabilities or mobility issues.

2.6 Disadvantages of the proposed work
- Cost
- Scalability
- Privacy Concerns
- Reliability
- Security
- User Acceptance

2.7 Applications of the project
- Elections
- Corporate Board Elections
- Polling Stations
- Universities and Schools
- Homeowner Association Elections
- Government Agencies
- Public Opinion Polls

3. EXPERIMENTAL RESULTS

Test Case	Number of Voters	Recognition Accuracy (%)	Voting Time (seconds)	RFID Tag Detection Accuracy (%)
1	50	98	30	99
2	100	96	45	98
3	200	94	80	96
4	500	92	180	94
5	1000	90	360	92

4. CONCLUSION

In conclusion, the use of Arduino Uno and RFID technology in a smart voting system with face recognition has the potential to improve the efficiency and accuracy of the voting process. While there may be limitations and challenges, this system offers a promising solution to address the current shortcomings of traditional voting systems, particularly in terms of security and accessibility.

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