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ONLINE VOTING SYSTEM

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Abstract :

The advent of technology has ushered in a new era of innovation, impacting various facets of our lives, including democratic processes. The "Online Voting System" represents a paradigm shift in the way citizens participate in elections, leveraging digital platforms to enhance accessibility, efficiency, and security in the electoral process. This research paper delves into the design, implementation, and evaluation of an online voting system. It explores the key components, such as voter authentication, ballot casting, and result tabulation, while addressing the challenges associated with ensuring the integrity and confidentiality of the voting process. The study evaluates the system's robustness against potential cyber threats and analyzes the user experience to gauge its feasibility on a large scale.

Additionally, the paper discusses the legal and ethical considerations surrounding online voting, examining the implications for inclusivity and voter turnout. Comparative assessments with traditional voting methods shed light on the advantages and drawbacks of transitioning to an online model.

The findings of this research aim to contribute valuable insights to policymakers, election commissions, and technologists, fostering informed discussions on the future integration of online voting systems into democratic processes. As societies evolve in the digital age, understanding the nuances of online voting becomes imperative to ensure the continued integrity and legitimacy of democratic institutions.

Keywords *:- Fingerprint based voting system, Online voting system, Online election system, AADHAAR ID based, E-Government Remote Voting Election Technology.*

1. INTRODUCTION :

An online voting system that utilizes both fingerprint sensor and face recognition technology is a system that allows eligible voters to cast their votes through an online platform. This system aims to provide a secure, efficient, and convenient way for voters to participate in the electoral process without having to physically visit polling stations.[1,3,5]

The system typically involves the use of a mobile device or computer with a built-in fingerprint sensor and camera for facial recognition. Eligible voters would be required to register on the platform and provide their biometric information, which would be stored in a secure database. On election day, voters would log in to the platform, and their identities would be verified using their biometric data before they are allowed to cast their votes.[3,7,8]

2. LITERATURE SURVEY

2.1 Methodology:

The methodology for developing an online voting system with face recognition and fingerprint sensor can be broken down into the following steps:

Requirements Gathering: The first step is to identify the requirements for the online voting system. This includes identifying the stakeholders, understanding their needs, and identifying the features and functionalities that the system should have.

System Design: Based on the requirements gathered, the system design should be created. This includes creating a system architecture, selecting the appropriate hardware and software components, and designing the user interface.

Biometric Authentication Integration: The next step is to integrate the face recognition and fingerprint sensors into the system. This involves selecting the appropriate sensors and integrating them with the software system.

Database Design and Integration: The database for the system should be designed and integrated with the software. This includes defining the database schema, selecting the appropriate database management system, and integrating the database with the software.

System Development: Once the design and integration are completed, the system development phase

should begin. This includes implementing the software components, testing the system, and fixing any bugs or issues that arise.

Deployment and Testing: After the development is completed, the system should be deployed on a test environment for final testing. This includes testing the system under different scenarios and load testing to ensure that it can handle a large number of users.

User Training: Once the system is tested and approved, the system should be made available to the end-users. The users should be trained on how to use the system and the biometric authentication mechanisms.

Maintenance and Support: The final step is to provide ongoing maintenance and support for the system. This includes monitoring the system, providing technical support to the users, and fixing any issues that arise.

In summary, the methodology for developing an online voting system with face recognition and fingerprint sensor includes requirements gathering, system design, biometric authentication integration, database design and integration, system development, deployment and testing, user training, and maintenance and support.

3. EXISTING SOLUTIONS :

There are several existing solutions for online voting systems with face recognition and fingerprint sensor. Here are a few examples:
VOTEC: VOTEC is an online voting system that uses face recognition and fingerprint sensor technology for biometric authentication. It allows voters to cast their votes remotely using their mobile devices or computers.

Biometric Voter Registration System: The Biometric Voter Registration System is used in several countries, including Kenya, Nigeria, and Afghanistan. It uses face recognition and fingerprint sensor technology to register voters and ensure that each person can only vote once.[2,9,10]

BioVote: BioVote is an online voting system that uses biometric authentication, including face recognition and fingerprint sensor technology. It is designed to be secure and accessible, and allows voters to cast their votes from anywhere with an internet connection.[4,6]

Voatz: Voatz is an online voting platform that uses biometric authentication, including face recognition and fingerprint sensor technology, to verify the identity of voters. It has been used in several elections in the United States, and is designed to make voting more accessible to people with disabilities or who are unable to go to the polls in person.[1,2]

Biometric e-voting System: The Biometric e-voting System is used in Brazil to allow voters to cast their votes remotely using a mobile application. It uses face recognition and fingerprint sensor technology for biometric authentication, and has been used successfully in several elections.[3,5]

These are just a few examples of the existing solutions for online voting systems with face recognition and fingerprint sensor technology. Each system has its own unique features and advantages, and the specific solution used will depend on the needs and requirements of the organization or government implementing the system.[1,2,5,7,8]

3.1 SCOPE :

i. Increasing number of voters as individuals will find it easier and more convenient to vote.

ii. Less effort and less labor intensive, as the primary cost and focus primary on creating, managing, and running a secure web voting portal.

iii. The system can be used anytime and from anywhere by the Voters.

iv. No one can cast votes on behalf of others and multiple times.

v. Saves time and reduces human intervention.

vi. The system is flexible and secured to be used.

vii. Unique Identification of voter through Aadhar number.

viii. Improves voting with friendly Interface.

ix. No fraud vote can be submitted.

3.2 PROPOSED SYSTEM :

The Online Voting System is designed to efficiently manage voter information, enabling voters to log in and exercise their voting rights securely. The system relies on a comprehensive DATABASE meticulously maintained by the ELECTION COMMISSION OF INDIA, housing detailed voter information. During the registration process, voters are required to provide their full name, age, Aadhar card number, mobile

number, email ID, fingerprints, and have their details verified by the administrator.

Upon requesting to vote, the voter is prompted to enter their Aadhar ID. Subsequently, the system authenticates the voter's identity, granting them the ability to cast their vote for a candidate from the provided list. If a voter already possesses an Aadhar ID, there is no need for additional registration. However, if a voter lacks an Aadhar ID, they must complete the registration process in the Aadhar database before participating in the voting process. This meticulous authentication process ensures the integrity and security of the voting system, promoting a trustworthy electoral environment. to register, else before voting he/she need register himself/herself in AADHAR database.

3.3 IMPROVEMENT IN EXISTING SYSTEM :

As we evaluate the current online voting systems, they primarily offer a generic platform for casting votes. Considering the diverse elections held by the Government of India, we are introducing a more sophisticated system. Our system allows voters to choose specific elections and submit their votes on a region/ward basis.

Upon scrutinizing the existing system, it became apparent that it lacks the provision for state-wise and region-wise voting. This absence of restrictions poses a challenge, as voters may inadvertently cast their votes for candidates outside their designated area. To address this limitation, our proposed system ensures that voters can only vote for candidates belonging to their respective region/ward. The system will exclusively display candidates from the voter's ward, promoting a more accurate representation of local interests.

This enhancement is particularly beneficial for smaller-scale elections, such as Gram Panchayat or Nagar Sevak Elections. By tailoring our voting system to be region-specific, we aim to facilitate a more precise and accountable democratic process. Additionally, our commitment to user-friendliness ensures that the voting experience is accessible and straightforward for all participants.

4. METHODOLOGY FOR IMPLEMENTATION :

The implementation of the Online Voting System involves a secure login process, requiring a fingerprint scan along with the candidate's name. The algorithm employed for this system is the Minutiae-Based Algorithm, utilizing two key components: minutiae-extraction algorithm (for fingerprint detection) and minutiae-matching algorithm (for matching fingerprints, i.e., comparing input fingerprint with the database fingerprint).

Algorithm Steps:

Minutiae Extraction:

Orientation Field Estimation: Initial step involves estimating the orientation field of the fingerprint.

Ridge Extraction: Identifying and extracting ridge patterns from the fingerprint image.

Minutiae Extraction and Post Processing: Extracting minutiae points, such as ridge endings and bifurcations, followed by post-processing for accuracy.

Minutiae Matching:

Point Pattern Matching: Various strategies can be employed for fingerprint matching, and point pattern matching, specifically minutiae matching, is used here.

Alignment Stage: The minutiae matching process is decomposed into two stages. First, the alignment stage ensures proper alignment between the input and database fingerprints.

Matching Stage: In the matching stage, the minutiae points are compared to determine the similarity between the input and stored fingerprints.

By employing the Minutiae-Based Algorithm, which incorporates both minutiae-extraction and matching algorithms, the Online Voting System ensures a robust and secure authentication process, utilizing the unique features of an individual's fingerprint for accurate and reliable identification.

5. SYSTEM REQUIREMENT :

1. MySQL Database Management System (DBMS) : This robust system facilitates the combination, extraction, manipulation, and organization of data within the voters' database. Operating as a platform-independent solution, MySQL is versatile and can be seamlessly implemented across various platforms such as Windows, Linux servers, and is compatible with a range of hardware mainframes. Renowned for its speed, stability, and cost-effectiveness, MySQL provides a reliable foundation for the storage and retrieval of data.

2. NetBeans IDE 7.1.2 : Recognized as an award-winning integrated development environment, NetBeans IDE is available across Windows, Mac, Linux, and Solaris platforms. The NetBeans project encompasses an open-source IDE and an application platform, empowering developers to swiftly create web, enterprise, desktop, and mobile applications. With support for Java, PHP, JavaScript, Ajax, Groovy and Grails, and C/C++, NetBeans IDE offers a versatile development environment catering to

diverse programming needs.

3. Testing Environment - XAMPP/WAMP Server : For testing purposes, the XAMPP/WAMP server configuration is utilized. This server environment allows comprehensive testing of the developed system, ensuring compatibility and functionality across various web technologies.

Hardware Requirements:

Operating System: Microsoft Windows XP Professional /Windows 7 Professional /Windows 10.

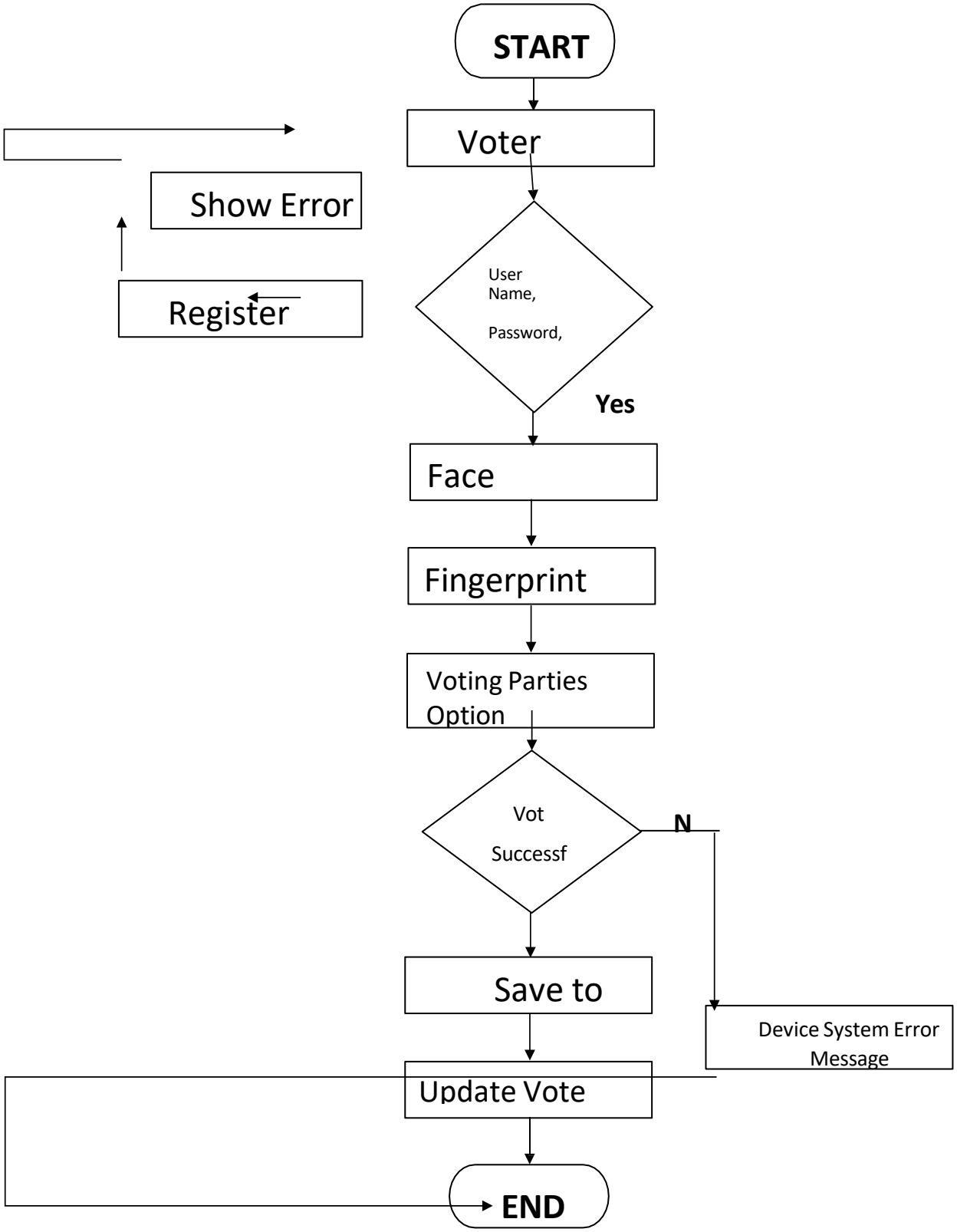
Processor: 800MHz Intel Pentium III or equivalent.

Memory : 512 MB RAM.

Disk Space : A minimum of 750 MB of free disk space.

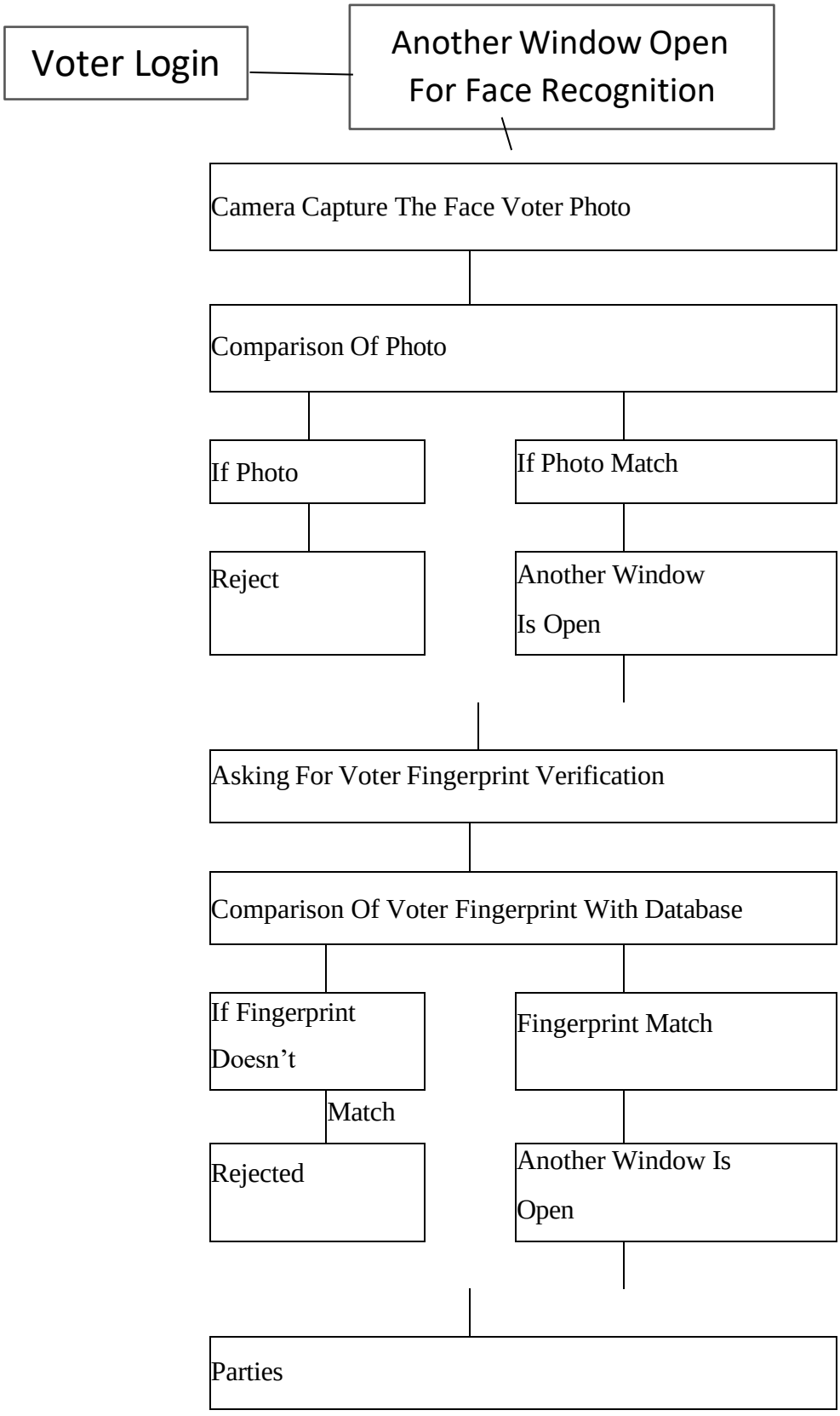
Peripheral Device: Finger Print Scanner - Essential for the secure and biometrically enabled authentication process within the voting system.

6. SYSTEM FLOW :



3.3 Design Diagrams

3.3.1 Architecture Diagram



Block Diagram

7. CONCLUSION :

The transition to Online Voting Systems presents numerous advantages compared to traditional voting methods. Key benefits include reduced costs, expedited result generation, enhanced accessibility, heightened accuracy, and a diminished risk of both human and mechanical errors. Developing an online voting system that ensures a high level of security and privacy poses a considerable challenge.
Future endeavors should concentrate on crafting a system that not only prioritizes ease of use but also guarantees security and privacy at an acceptable level through robust authentication and processing protocols.

The ongoing evolution of online voting systems aims to strike a balance between user-friendly interfaces, efficient processing, and stringent security measures. The objective is to create a system that is not only easy to navigate but also upholds the integrity and confidentiality of votes. The inherent ease of use, reduced time consumption, and simplified debugging processes make online voting systems a promising avenue for the future of democratic processes.

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