Online Voting System using Retina and Finger-printAuthentication

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***Abstract*—The Online electronic voting system utilizes real time fingerprint identification system based on minutiae algorithm alongside real time retina pattern recognition using Hough transform algorithm. The user can login or authenticate their account using their government issued IDs. The retina andfingerprint are scanned during the voting process and enables voting only when the scanned bio metrics are positively matched. To ensure more transparency, live updates of the vote are presented onscreen. The vote can be casted only once when all the patterns are positively identified and matched.**

Keywords—Online Voting, Fingerprint, Retina

I. Introduction (*Heading 1*)

The population of India, a country based on the rule of law, is 700 million. All communities, individuals, and organizations," the Indian government claims. Every person has the right to vote for and select the creator of their choosing. Voting became a significant political event for thefirst time in India in the 18th century. Anybody who wants tocast a ballot must be at least 18 years old.

Our country, India, is home to the largest democracy on earth. Why it so important to guarantee that the ruling body is selected through a fair election. India only has an offline voting system, which is inefficient and subpar because it takes a long time to process and broadcast the results and requires a large workforce. Hence, for the system to work effectively, a change must be made that solves these shortcomings. The new approach simplifies things byremoving the requirement that voters cast their ballots basedon how they look. further helps eliminate vote fraud and get accurate results very away after the election

II. Motivation

Using fingerprint and retina verification to prevent fraud and tampering can increase the security of an online voting system. When biometric data is used to authenticate voter identification, it is more difficult for unauthorized voters to vote or to tamper with the voting process.

By lowering errors and disparities, an online voting system that employs retina and fingerprint authentication canincrease vote accuracy. When different and independently verifiable ways of identification are employed, it is simpler toverify that every vote is accurately counted and recorded.

Because they can utilize an online voting system with fingerprint and retina authentication from any location with an internet connection, voters may feel it more comfortable to do so. As a result, voting may be made easy for people, especially for those who might find it difficult to visit normalpolling stations due to their location, mobility, or other challenges. An online voting system that uses fingerprint andretina authentication may reduce the costs associated with conventional voting procedures, such as the cost of printing ballots and setting up polling sites. By moving the voting process online, it would be possible to save money andresources.

All things considered, using a fingerprint and retina verification system for online voting can provide a variety ofbenefits, including improved security, accuracy, simplicity, and cost savings.

III. Existing System

In our country, electronic voting machines are currently in use. An EVM is made up of two parts: the control unit andthe balloting unit (Electronic Voting Machine). These elements are connected by a cable. The EVM control unit is kept by the poll worker or the presiding officer. The ballotingdevice is kept inside the voting compartment where voters can cast their ballots. One of these will ensure that the poll worker can verify your identity. The poll worker will press the ballot button to allow the voter to cast their ballot rather than distributing ballot papers along with the EVM. The

device will show a blue button and a list of candidates' names or symbols. By clicking the button next to the candidate's name, the voter can choose that person.

I. Literature Survey

A. *Advanced Voting System using Fingerprint.*

This study proposes an Arduino-based finger print voting system that facilitates speedy and error-free election voting. The Fingerprint Voting System will allow users to cast their vote for the candidate of their choice by incorporating fingerprint authentication. The system is made up of an LCDscreen, an Arduino Uno micro controller board, a power supply, and a fingerprint module.

B. *Retina based authentication for E-voting systemusing MD5 Algorithm.*

The user data are digitally gathered during this process. An important component of an online voting system is datasecurity. The source won't be accessible to authorized users if the bio-metric template is changed. The retinal blood vessels are extracted from the retinal picture using a box counting method. Using the MD5 algorithm and the high descriptor value in an image, it analyses and delivers a higher level of security and better image encryption. A tree data structure is used to perform the matching operation.

C. *Electronic Voting System using Biometrics,Raspberry Pi and TFT Module.*

The voter in this voting system can input their Aadhaar card number on an LCD screen that is connected to a Raspberry Pi. They employ a mix of software and hardware. A hardware component attached to the fingerprint scanner and touch display is the Raspberry Pi 3B+ (RPI). The information is kept in the cloud. Aadhaar-ID will be entered by the voter on a touch screen module, and their fingerprint will be scanned and compared to a database maintained in the cloud. After the vote count has increased, the database will get a request to disable the user in order to prevent duplicate voting.

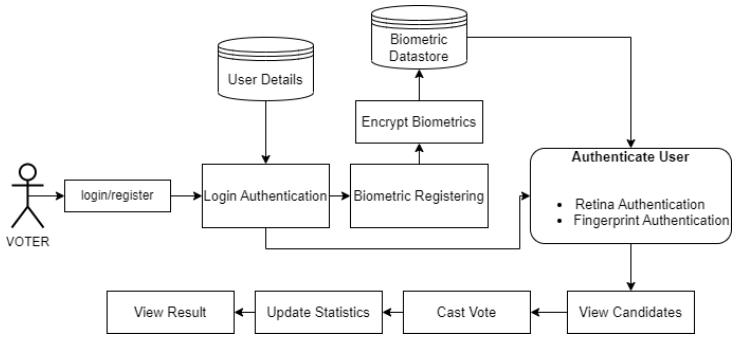
II. Proposed System

The E Voting system is a digitized system. The process consists of acquiring the user's data in digital manner. The data stored must be protected from unofficial persons. And this in self is a major issue of this process. The security of the data is the most important factor that upholds the integrity of the system. Retina security technology make use of the blood vessel patterns present in the eye. The structure of the vascular structure of the retina are distinguishable from person to person. Hence, we use this unique feature as the human identifier in the system.

IR technology, that is a recent technological advancement absorbs blood vessels in the retina. Blood vessel scanning technology is found out to be much faster than other technologies. Military grade high security environments make use of Retina security technology.

In our system we authenticate the voters in 3 authentication features. First, we authenticate the user by using the hashing code during the login time. We authenticate using retina bio metrics or Fingerprint We can register our retina, fingerprint to the system if we are a new user.

We can observe the actual operation of our system in our architecture diagram. The voter can log into our system or register. Voters should submit their bio metric data, which includes their fingerprint and retina, if they are registering as new users. If a voter is already registered, they must first provide their username and password. After that, a hash code authentication is required to access our system's home page.



Then, if they need to cast a ballot, they must successfully authenticate using their retina and fingerprints. Voters can then view candidate details, which should include the candidate's name and symbol, after the authentication process. Then the voter can choose a candidate and cast their ballot. Voter cannot amend or cast another vote using the same ID after submitting their final vote.

III. Future Work

The retinal authentication component of our online voting system is a big challenge. The intricate procedure of retina scanning entails taking pictures of and examining the distinct blood vessel patterns in the retina. However, the pupil may enlarge under various brightness conditions, making it challenging to scan with the necessary precision. In order to solve this problem, we included a second upload option for retina images that enables users to verify their identity using a previously taken retina image.

We want to improve the authentication procedure's overall usability and precision by integrating the opportunity to submit retinal images. Users of this alternate technique can submit a retina image that was taken under controlled circumstances, resulting in a more trustworthy authentication procedure.

Additionally, we acknowledge the necessity of mobile device optimisation for our voting system. In the current digital era, mobile phones are widely used, so it is essential to make our online voting system's user interface mobile-friendly. By doing this, people can easily use their mobile devices to access the system and vote from the comfort of their own homes.

We created a responsive design that adjusts to various screen sizes and resolutions to make it easier to implement mobile-friendly functions. This guarantees that the voting process will continue to be accessible and usable on a variety of mobile devices, giving users a smooth voting experience. We recognise the significance of preserving the accuracy of the voter list in addition to these technical improvements. At the moment, the administrator is the only one responsible for managing voter registration. We are providing registration request functionality from the voter side to enhance and broaden this procedure.

People who are qualified to vote can submit their information and ask to be added to the voter list using the registration request tool. Before authorising the applicants' registration, the admin will examine these requests and confirm their eligibility. This strategy allows eligible voters to actively participate in the registration process while ensuring that the voter list is accurate and current.

Our online voting system hopes to improve the authentication process by providing alternate options like retina image upload. A mobile-friendly design makes the system more accessible and makes it possible for people to quickly cast their ballots from home. The registration request function also guarantees a quicker and more inclusive process for adding eligible voters to the voter list.

I. Result

A reliable online voting system that enables secure and validated voting has been built as part of our project. We have put in place stringent biometric authentication procedures, specifically fingerprint and retina biometrics, for voters to cast their ballots for maintaining the integrity of the system.

We can confirm voters' identities and make sure that only qualified people can cast a ballot by requiring them to authenticate using their fingerprint or retina. These biometric authentication techniques offer a high level of accuracy and stop attempted vote fraud. We have added an extra layer of protection on top of biometrics by adding one-time password (OTP) authentication during the login process. This provides an additional layer of assurance that only individuals with the proper authorization can access the voting system.

We have implemented facial authentication for both candidate and voter registration in order to further strengthen the security and legitimacy of the system. This procedure entails photographing and examining each person's particular facial traits. The system will classify the candidate or voter as invalid if the face authentication fails, prohibiting any unauthorised or fraudulent involvement. Our method makes sure that each voter can only cast one vote in order to uphold the one-person, one-vote rule. This ensures the fairness and integrity of the electoral process by preventing multiple voting attempts by the same person.

Additionally, we have taken steps to ensure that the administrator has no way to tamper with the votes cast. We prohibit any unauthorised access to or interference with the voting data by putting in place stringent access restrictions and auditing procedures. As a result, the votes cast by the voters are kept safe and unaltered.

In conclusion, to enable secure and authorised voting, our online voting system combines biometric authentication (fingerprint and retina), OTP authentication, and face authentication. Multiple voting attempts are prevented, and the administrator is unable to influence the results of the vote. These methods offer a trustworthy and transparent voting system while preserving the honesty and fairness of the electoral process.

CONCLUSION

The E-Voting System is a digital electronic system where user data is electronically collected and securely processed. The most crucial component of our suggested solution is security. We use fingerprint authentication in addition to retina-based authentication. These two are used to create a more precise voting authentication. The most crucial identity checking mechanism in security is retina security. As fingerprints are not always subject to damage, fingerprint authentication offers a better understanding of retina authentication.

When a user logs into the system or registers as a new user, hash code authentication is also used. The biometric information is kept in a data storage and accessible when logging in and casting a ballot. The data store contains the vote totals, which are also shown in real time. If a vulnerability is found, the system alerts the user and ensures that the system is renderedinoperable.

In our system, there are two actors: the voter and the administrator. Both the user and candidate details are maintained by the administrator. High-end security and integrity in the voting system will be provided by the tiers ofauthentication now used, namely Retina, Fingerprint, Hash Code, and Aadhar verification.

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