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IRIS BASED MODERN VOTING SYSTEM USING DEEP LEARNING ALGORITHM

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Abstract - *Paper ballots and electronic voting machines (EVMs) with Direct Response Electronic (DRE) or Identical Ballot Boxes have long been the mainstay of traditional voting methods. These solutions do not, however, come without shortcomings, such as issues with accessibility, security, and accuracy. This paper suggests a novel solution to address these drawbacks: a digital voting system that makes use of Iris recognition technology. The study's Iris Recognition-based Voting System, which uses each person's own iris pattern for identity verification, provides a reliable solution. An automatic biometric identification technology called iris recognition assesses each person's unique and intricate iris patterns, offering a high degree of precision and dependability The voter's iris is gathered and used for identification at the voting location via a straightforward iris scan, which is part of the proposed system. To ensure precise authentication, the iris recognition procedure consists of image acquisition, iris segmentation, feature extraction, and pattern matching. This method solves a number of issues with conventional voting systems by incorporating Iris recognition technology into the voting process. By offering a dependable means of identity verification, it lowers the possibility of fraudulent activity and increases voter accessibility, all of which contribute to increased security. In summary, this research offers a noteworthy progression in voting systems by utilizing state-of-the-art technology to surmount the constraints of current approaches. In addition to improving voting's speed and integrity, the Iris recognition-based voting system opens the door for a more safe and welcoming democratic environment.*

Key Words: Artificial Intelligence, Convolutional neural network, Iris recognition, Voting system, Houge Circles.

1. INTRODUCTION

The voting process's accessibility and integrity are critical components of democratic governance. Societies have used a variety of techniques over the ages to encourage voter participation in elections, from the conventional paper ballot to the more recent computerized voting systems. But there are drawbacks to these techniques as well, such as issues with inclusivity, security, and accuracy. Technological developments have provided creative answers to these problems that try to improve the voting process. The study suggests that using Iris recognition technology into the voting process is one such possibility. Based on the distinctive patterns found in the iris, iris recognition, an automated biometric identification technology, provides a special and trustworthy way to confirm an individual's identity. In order to address the drawbacks of conventional voting procedures, this study investigates the idea of an Iris recognition-based voting system. This method seeks to address issues with voter verification, security, and accessibility by utilizing the high accuracy and dependability of iris recognition. This innovative method of voting systems is being introduced at a critical time when inclusive and safe electoral procedures are more important than ever. In order to address the drawbacks of conventional voting procedures, this study investigates the idea of an Iris recognition-based voting system. This method seeks to address issues with voter verification, security, and accessibility by utilizing the high accuracy and dependability of iris recognition. This innovative method of voting systems is being introduced at a critical time when inclusive and safe electoral procedures are more important than ever.

2. EXISTING SYSTEM

In order to address the drawbacks of conventional voting procedures, this study investigates the idea of an Iris recognition-based voting system. This method seeks to address issues with voter verification, security, and accessibility by utilizing the high accuracy and dependability of iris recognition. This innovative method of voting systems is being introduced at a critical time when inclusive and safe electoral procedures are more important than ever. Electronic voting machines have become more and more common as a more effective substitute for paper ballots in recent years. Voters can use electronic voting machines (EVMs), and the machine will automatically tabulate the results. This expedites the tallying of votes and simplifies the voting process, allowing for a quicker announcement of election results. However, questions about the security and dependability of EVMs have been raised because to their broad adoption. EVMs are susceptible to hacking and tampering, according to critics, jeopardizing the democratic process's integrity and eroding public confidence in election results. Furthermore, traditional techniques of voter authentication, such presenting identification documents or confirming voter registration data, are used for both paper-based ballots and electronic voting machines. These procedures are not infallible and are subject to manipulation or abuse, even if their goal is to stop fraud and guarantee that only legitimate voters ballotss

Fig.1 Voting based on Ballot System and EVM

3. PROPOSED SYSTEM

This work suggests a fresh approach: an Iris recognition-based voting system—in light of the drawbacks and risks present in conventional voting systems. This method improves the security and integrity of the voting process by utilizing Iris recognition technology, an advanced biometric identification system. Iris identification technology verifies a person's identify by using the distinctive patterns found in their iris. Because iris patterns are so unique and intricate, they are perfect for biometric identification. The device can identify a voter by taking a high-resolution picture of their iris, extracting important characteristics, and comparing them to a database of registered voters. An easy iris scan is performed at the voting place to start the Iris recognition-based voting system's installation. Voters are subjected to a brief, non-invasive iris scan upon arrival, which records the distinctive features of their irises. In order to verify the voter's identification, this biometric data is further analyzed using a number of methods, such as picture capture, iris segmentation, feature extraction, and pattern matching. The high degree of accuracy and dependability of the suggested approach is one of its main benefits. Because iris recognition technology has such a low false acceptance rate, it is quite unlikely that someone who is not permitted will be wrongly recognized as a voter. This improves the general security of the electoral process by drastically lowering the possibility of fraudulent acts like impersonation or multiple voting.

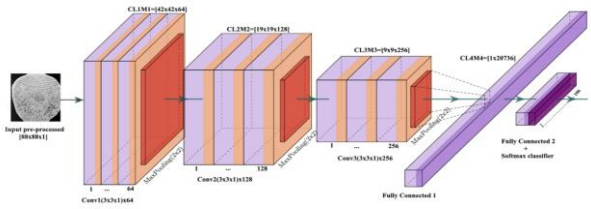

Fig.2 working model of Convolutional Neural Networks

Additionally, Iris identification technology makes voting easier for all residents to participate in. Iris recognition removes the requirement for physical identification documents or voter registration records, in contrast to conventional voter authentication techniques that can call for such. This facilitates and broadens the voting process, especially for those who might have trouble getting or showing identification. To sum up, the Iris recognition-based Voting System is a major development in voting technology that improves voting process security, accuracy, and accessibility while resolving the drawbacks of previous systems. This method provides a reliable way to protect the fairness and transparency principles and guarantee the integrity of democratic elections by utilizing the capability of biometric identification. The Iris recognition-based Voting System delivers a level of simplicity and inclusivity that is unmatched in traditional voting techniques, in addition to its unmatched precision and dependability. Voters are guaranteed a seamless experience with the iris scanning technique due to its efficiency and simplicity, in contrast to the laborious steps that are frequently involved with physical identity certificates. This simplified method increases security while minimizing disturbances, making the voting process more accessible overall. Moreover, the use of iris recognition technology guarantees that the voting process is more convenient and inclusive for all people, especially those who might encounter difficulties obtaining or presenting physical identification documents or registration records.

4. METHODOLOGY

The present study employs a technique that comprises multiple pivotal phases with the objective of executing and verifying the Iris recognition-driven Voting System. First, enrollment and data gathering protocols were set up using certain locations that had iris scanners installed. Participants gave their informed consent, and high-resolution pictures of their irises were taken in standardized lighting settings to provide the best possible quality. Following this, participants were led through an easy-to-use iris scanning procedure at pre-designated polling locations. Accurate image capture was ensured by real-time feedback mechanisms. To separate the iris region and improve clarity, the obtained iris pictures were subjected to extensive pre-processing and segmentation. After extracting pertinent iris characteristics using feature extraction techniques as Haar cascades and Hough transforms, pattern recognition algorithms were used to match the features to the profiles of enrolled participants. Support vector machines and convolutional neural networks—two machine learning techniques—were used to efficiently recognize and classify features. Ultimately, rigorous testing, performance metric evaluation, and validation tests with a variety of datasets were used to confirm the efficiency of the suggested system. Iterative refinement was then carried out to solve any issues or limitations that were found.

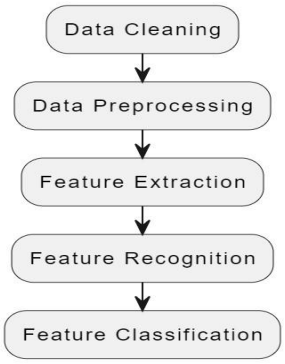

Fig.3 Data Flow diagram

5. PROPOSED MODULES AND ALGORITHM

The Iris recognition-based Voting System's suggested algorithm aims to efficiently and accurately authenticate voters. The process starts with the construction of enrollment centers outfitted with iris scanning equipment, where participants give their informed consent and have standardized, high-resolution iris photos taken. Pre-processing is applied on these pictures to improve clarity and segmentation is done to separate the iris area. The segmented iris images are then processed using methods like Haar cascades and Hough transforms to extract pertinent information. These traits are then compared to the profiles of registered participants using pattern recognition algorithms, which classify the data using machine learning techniques such as support vector machines or convolutional neural networks. Voters' iris photos are taken at pre-arranged spots during the voting process, and the same pre-processing and feature extraction procedures are used. Based on the similarity of their iris patterns, these derived attributes are then compared with enrolled profiles to validate voters. To further evaluate the algorithm's accuracy, efficiency, and resilience, evaluation and validation phases are included. To ensure generalizability, extensive testing is carried out to check performance measures including accuracy and false acceptance rate using a variety of datasets. The system is iteratively refined to solve any constraints or obstacles found, guaranteeing its efficacy in actual voting settings. Overall, the suggested algorithm contributes to the security and integrity of the voting process by offering a methodical and trustworthy approach to iris recognition for voter authentication.

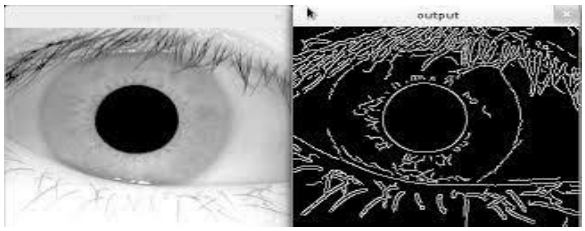

Fig.4 working model of Hough Circles Algorithm

6. CONCLUSION

We can prevent faults, automate the voting process, and maintain the time maintenance system by implementing this project in real time. It is also insensitive to changes in the amount of noise and brightness. In particular, it makes advantage of the wavelet transform's zero crossings for the distinct characteristics derived from the iris's grey-level profiles. It is less susceptible to noise and quantization mistakes and more computationally efficient because it only requires a small number of carefully chosen intermediate resolution levels for matching. In every instance where it is seen, the application's iris detection is extremely accurate. Compared to the surrounding area and the rest of the eye, the pupil has a somewhat distinct tint. This makes it possible to isolate the pupil using an intelligent threshold that is applied using data from the image histogram.

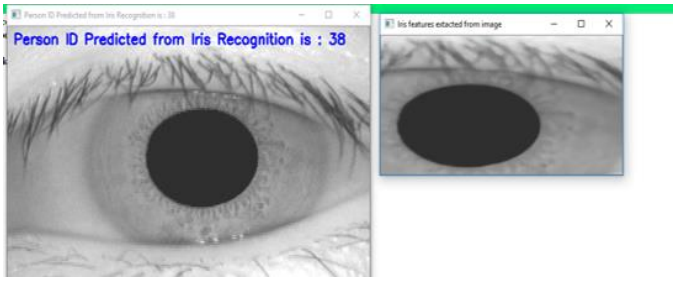

Fig.5 Pupil extraction and prediction.

Unfortunately, the iris does not have this feature, which makes it much harder to isolate than the pupil. The population is growing daily, which means that the voting system needs to be improved. Increasing civic engagement is the main objective of any voting system. While the voting methods outlined above are unquestionably excellent, there is always room for improvement.

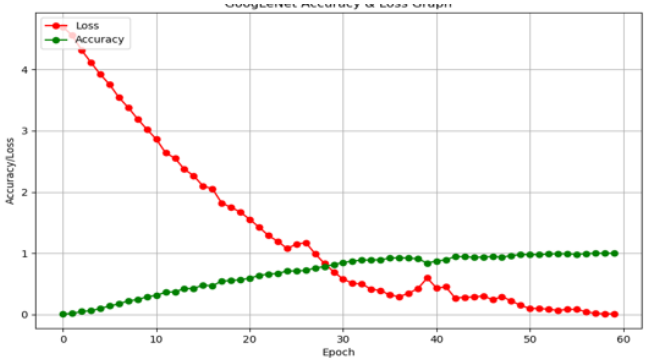

Fig.6 Performance and Accuracy of model

7. Future Scope

Future improvements to the Iris recognition-based voting system could significantly increase its effectiveness and guarantee the fairness of election procedures. One promising direction for biometric authentication is multi-modal

authentication, which incorporates additional biometric features like fingerprints or facial recognition to improve the system's accuracy and resistance to fraud. Moreover, the incorporation of blockchain technology offers a strong chance to reinforce the auditability and transparency of the voting procedure by offering an impenetrable ledger for documenting and validating voting transactions. Enabling remote voting, which makes use of the Iris recognition system to enable safe and convenient voting from any location with an internet connection, is another crucial area for improvement. Furthermore, continuous improvements to the system's interface and interaction design through iterative refinement aim to guarantee a smooth and simple voting process for all users. Last but not least, putting in place strong encryption and cryptographic protocols will be essential to protecting voter privacy and preventing any challenges to the integrity of election systems.

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