

Online Smart Voting System using Face Recognition

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Abstract:- An online voting system using face recognition is a digital platform designed to enhance the security and accuracy of the voting process. The system utilizes facial recognition technology to verify the identity of voters, ensuring that only eligible voters can participate in the election. This system eliminates the need for physical polling stations, reducing costs and increasing accessibility for voters. The abstract of this system would detail its features, including its ability to authenticate voter identities, securely store votes, and prevent fraud. It would also discuss the benefits of using such a system, such as increased voter turnout and improved transparency in the electoral process. Object Detection using Haar feature-based cascade classifiers is an effective object detection method. Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image. Then the server checks for the data from the database and compares that data which is already existing in database. If the data matches with the already stored information, the person is allowed to poll the vote. If not, a message is displayed on the screen and therefore the person is not allowed to poll the vote. Overall, an online voting system using face recognition technology has the potential to revolutionize the way we conduct elections, making the process more efficient, secure, and accessible for all.

Keywords:- Face Recognition, Haar Cascade, LBPH, User Authentication.

I. INTRODUCTION

As per the records of TOI 24 Jan 2009 11 lakhs fake votes were observed in Delhi. Then according to India News June 2013: 30000 illegal voters were found in election commission under Sheila Dikshit constituency. Another news which was alleged by LJP.

(Lok Janshakti Party) Chief, Ram Vilas Paswan saying that Bihar election were having 30% fake voter- cards. Election involves both public or private vote which depends on the position. Local, state, and federal governments are some of the most important positions. In paper based on election, Voters cast their votes by simply depositing their ballots in sealed boxes distributed across the electoral circuits around a given country. After ending of election period, the boxes which contain ballot control unit are opened and votes are counted manually in presence of the certified officials appointed by election commission.

So, it is a time-consuming process and requires a lot of resources to conduct voting process. In this paper we have proposed an online voting system to cast the vote using face recognition. The information about the Face is passed to the server unit for further verification. Then the server checks for the data from the database and compares that data which is already existing in database.

If the data matches with the already stored information, the person is allowed to poll the vote. If not, a message is displayed on the screen and therefore the person is not allowed to poll the vote. For voting representatives are appointed by electorates. In current scenario voter needs to show his/her voter ID card to cast the vote on the booth. So, this process is time consuming as the voter ID card needs to be get verified by the officials.

Thus, to speed up the voting process and avoid such type of problems, we have proposed the new system.

II. LITERATURE SURVEY

As per the bylaw of the Constitution of India, the Election Commission of India (ECI) has been driven to conduct elections honestly and autonomously at regular intervals. For this, from the last decade onwards they are implementing advanced technologies in the election process

to ensure efficacy, less time consumption, and cost. Right now, the ECI effectively utilizing the Voter-Verified Paper Audit Trail (VVPAT) with an Electronic Voting Machine (EVM) to ensure each individual votes. However, still, the ECI struggling to control malpractice that exists in the election process while verifying voters with an electoral list. To overcome these issues, a face recognition device is embedded with the EVM. The ECI trying to achieve a more than ninety-five percent polling rate in a democratic country. At present, the average polling rate in all types of elections has not reached a mere seventy percent. The ECI is unable to achieve its target due to people migrating from state to state and abroad for employment [1]. The electoral system is the backbone of democracy and organization. The electoral system has experienced many efficient changes within the past few decades. India being a majority rule government, the world's biggest, still directs its races utilizing either Secret Ballot Voting (SBV) or Electronic Voting Machines (EVM), the two of which include significant expenses, physical work and are wasteful. In the existing system, it verified only identification proof, which made more chances for fake voting. To avoid the above issues, we developed a web-based smart voting system along with novel face detection and recognition approach. The entire online framework empowers individuals to protect their votes from any place on the planet. Utilizing the ID of appearances lessens the shot at copying a vote and the individuals who are enlisted advance to the political race and are perceived by the framework will be permitted to cast a ballot. Accordingly, the methodology makes the framework the most ideal approach to make the choice [2]. Web-based system enables voter to cast their votes from anywhere in the world. Online website has a prevented IP address generated by the government of India for election purpose. People should register the name and address in the website. Election commission will collect the fingerprint and face image from the voters. The database or server will store the images. When the images are obtained on the casting day, it will be compared with database and provides a secured voting on the Election Day. System utilizes faces and fingerprints to unlock the voting system, similar to the mobile phone are used. The current system requires the physical presence of voter, which is inconvenient to many voters. The process consumes less time as well. Using the detection of face and fingerprint images, the number of fake voters can be reduced. The eyes and eyebrows distance remains constant with growing age to make the system more secure. This research work utilizes ten print image to detect the correct name of voter [3]. Blockchain is used to store data which is near impossible to change or tamper with as it is very secure in nature. Voting as a process in any nation is an essential event and if votes get miscalculated by any external source it will be harmful. To avoid such kinds of situations and making it more comfortable blockchain technology comes in acknowledgment. This paper proposes a decentralized national e-voting system based on blockchain technology. It includes an admin panel to schedule the voting, manage candidates and declare the results. The web application will provide the users with an interface to enter their Aadhaar card ID (text input) and a photo of themselves at the time of voting. The eligibility of the voter will be checked at the time they enter their Aadhaar card ID. Eligible voter's phone numbers

will be verified via One Time Password (OTP). After voter verification, individual voters will be considered eligible for voting. During voting, voters will be monitored through a webcam/front camera. The votes will be stored in a blockchain and any tampering would be detected easily. The address and the corresponding constituency will be checked in the backend. Voting results will be declared on a specified date and will be handled by the admin. The results will be displayed graphically with various options to choose from and will also include past results and statistics [4]. India has only offline voting system which is not effective and up to the mark as it requires large man force and it also requires more time to process and publish the results. Therefore, to be made effective, the system needs a change, which overcomes these disadvantages. The new method does not force the person's physical appearance to vote, which makes the things easier. This paper focuses on a system where the user can vote remotely from anywhere using his/her computer or mobile phone and doesn't require the voter to go to the polling station through two step authentication of face recognition and OTP system. This project also allows the user to vote offline as well if he/she feels that is comfortable. The face scanning system is used to record the voter's face prior to the election and is useful at the time of voting. The offline voting system is improvised with the help of RFID tags instead of voter ID. This system also enables the user the citizens to see the results anytime which can avoid situations that pave way to vote tampering [5]. The citizens can cast their vote either through ballot paper or Electronic Voting Machine [EVM]. Using either way of voting has a chance to misuse the other votes. As a result, this research work proposes a fingerprint sensor and voter fingerprints will be taken and it will be extracted and saved in the database for the voter registration and authentication processes. Storing the information in the database will prevent more than one registration from a single person. At the time of voting or during voting day, the individual person need to scan his/her fingerprint and it will be compared with the fingerprint database if the fingerprint is found in the fingerprint database. By using the Voter identity number and fingerprint, numerous duplicate registrations can be stopped and this will lead to high rate of actual success during voting. Voters can cast their ballots from any part of world by using their voter's unique identifier, authentication responses given on enrollment, and a token key supplied immediately for every member via the specially designed election web module. The administrator will send the token to the linked candidate's Email address. This proposed project has been implemented [6].

III. METHODOLOGY

A. Open CV

OpenCV-Python open-source library, which is used for computer vision in Artificial intelligence, Machine Learning, face recognition, etc.

B. Haar Cascade

Object Detection using Haar feature-based cascade classifiers is an effective object detection method. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then

used to detect objects in other images. Each feature is a single value obtained by subtracting sum of pixels under the white rectangle from sum of pixels under the black rectangle.

$$F(\text{Haar}) = \sum F_{\text{white}} - \sum F_{\text{black}}$$

$$\sum F_{\text{white}} = \text{Sum of pixels of bright area}$$

$$\sum F_{\text{black}} = \text{Sum of pixels of dark area}$$

$F(\text{Haar})$ = the Haar-like feature

C. LBPH Algorithm

Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. Then convert this binary value to a decimal value and set it to the central value of the matrix, which is a pixel from the original LBP operator considers a 3×3 patch, so the surrounding pixels form a binary number of 8 digits. After all the pixels in an image are labeled, LBP feature map, and a histogram that consists of 256 bins is obtained. The LBP histogram can be used as a feature vector for classification where each bin represents one feature.

$$\text{LBP } P, R(x_c, y_c) = p - 0 \sum P - 1 s(gp - gc) 2p$$

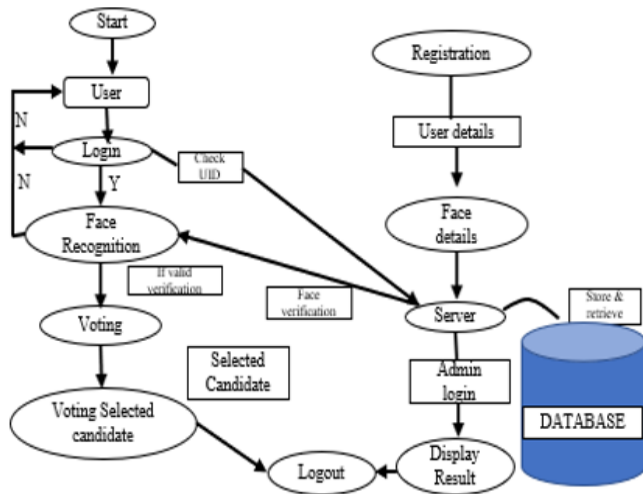


Fig. 1: User Module Architecture

Fig.1 uses face recognition to verify user's identity based on their facial features.

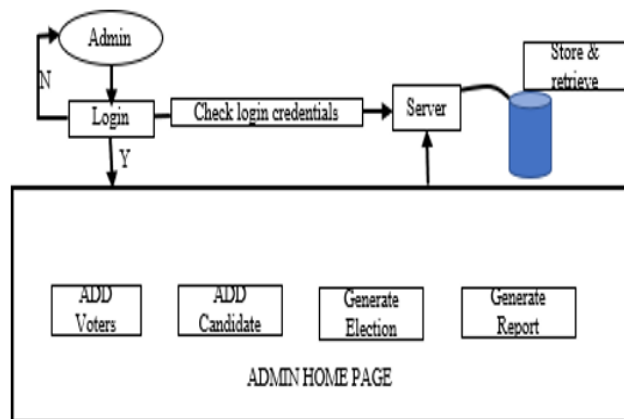


Fig. 2: Admin Module Architecture

Fig.2 uses username & password or other forms of authentication to ensure that only authorized administrators can access the admin interface.

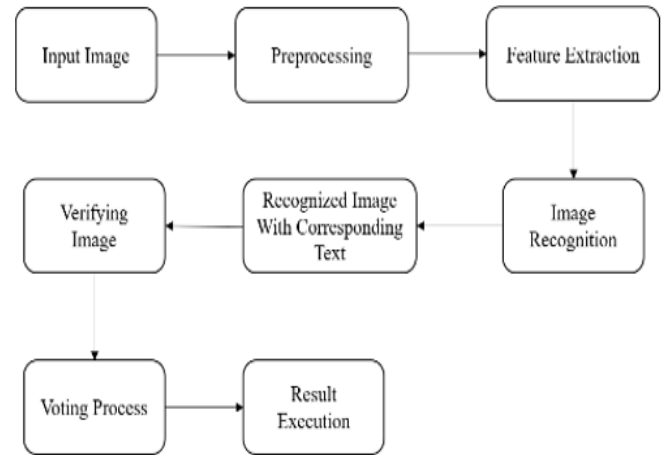


Fig. 3: Block Diagram

Fig.3 shows the different components of online smart voting system work together to provide user friendly voting experience.

IV. OUTPUT RESULTS

Initially, user needs to register in the system by providing information such as Aadhaar number, Mobile number, City, Age, Password etc. This information is stored in voter dataset. The system takes input image from the user at the time of registration through webcam. This image is stored in face dataset for template matching. Then forecasting the vote, user needs to login to the system by entering Aadhaar number and Password.

We must have a very good quality camera to get the efficient detection and recognition. It will capture the video. The video into convert the multiple frames. It will be helpful for more accurate to produce the results. Facial recognition is a way of identifying or confirming an individual's identity using their face. Facial recognition systems can be used to identify people in photos, videos, or in real-time. Facial recognition is a category of biometric security.



Fig. 4: User Registration

The primary function of Fig.4 is to manage the registration of eligible voters for the upcoming election.

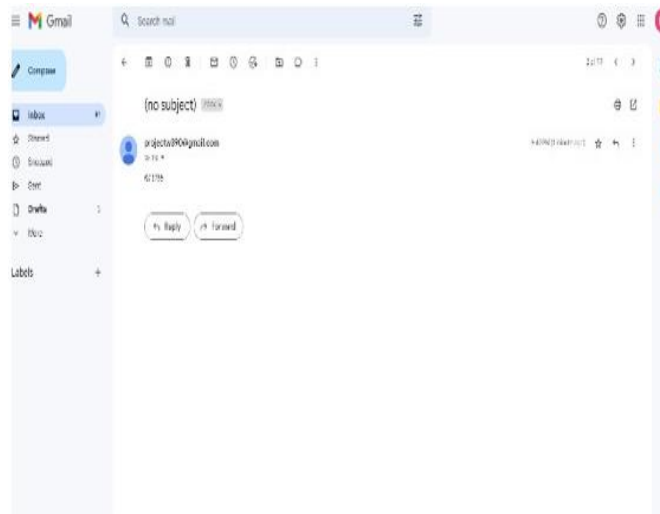


Fig. 5: Verification Code in Email

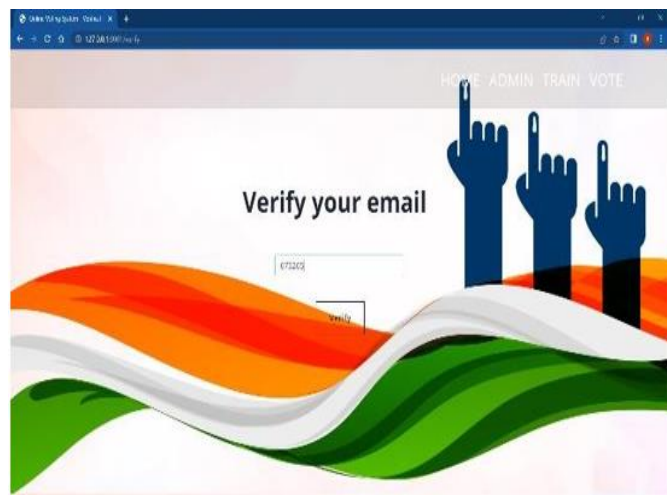


Fig. 6: Email Authentication



Fig.7: Face Recognition for Authentication

V. CONCLUSION

At present our government is spending more than 125 crores for conducting a Lok Sabha election. This money is spent on issues such as security, electoral ballots etc. The average percentage of voting is a less than 60%. Moreover, voting fraud can be easily done in the present system. Also, the percentage of literates coming to vote is very less. But with our system the money spent on election can be reduced to less than 10 crores. Also, there is no chance of voter frauds and the money spent on security can be drastically decreased. Persons who have an internet connection at home with a web camera can vote without taking the strain to come to voting booths. the implementation of an online voting system using facial recognition technology has the potential to increase accessibility, convenience, and security in the electoral process. The use of facial recognition technology can help to verify the identity of voters, prevent fraudulent activities, and provide a seamless voting experience. However, it is important to ensure that the system is designed and implemented in a way that guarantees the privacy and security of voters' personal information and prevents any potential bias or discrimination. Additionally, it is crucial to provide alternative options for individuals who may not have access to or may not be comfortable with using facial recognition technology. Overall, while an online voting system using facial recognition has the potential to improved.

VI. FUTURE WORK

The future scope for an online voting system using facial recognition technology is vast and exciting. As facial recognition technology continues to advance, we can expect higher accuracy rates and improved reliability in verifying the identity of voters. This will help to ensure the integrity of the voting process. Blockchain technology can help to provide a secure and transparent voting process. By integrating blockchain with facial recognition technology, we can create a tamper-proof voting system that ensures the accuracy and transparency of the results. User experience is a critical factor in the success of an online voting system. Future advancements in the design and user interface can help to make the process more user-friendly and intuitive. The use of facial recognition technology can extend beyond the electoral process. It can be used in various sectors like banking, healthcare, and education, to verify the identity of individuals and improve security. Overall, the future of online voting systems using facial recognition technology is promising, and we can expect to see further development and integration of this technology in the coming years.

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