



SMART ONLINE VOTING WEB BASED APPLICATION USING FACE RECOGNITION, AADHAR & OTP VERIFICATION

S Anbumani MCA¹, Mr. J. Jayapandian M.C.A, M.Phil²

Department of MCA & Krishnasamy College of Engineering & Technology¹

Asso.Prof, Department of MCA & Krishnasamy College of Engineering & Technology²

Abstract: Elections are a crucial part of any democratic system, and it is essential to ensure that the voting process is conducted in a fair and transparent manner. In traditional paper-based elections, the process is time-consuming, resource-intensive, and prone to errors. In this context, the use of technology can significantly improve the efficiency, security, and accuracy of the voting process. In this project, we propose an online voting system that uses face recognition technology to identify and authenticate voters. The proposed system allows voters to cast their votes remotely, eliminating the need for physical ballot boxes and reducing the cost and time involved in the voting process. The system works by capturing the facial image of the voter and passing it to the server unit for verification. The server compares the facial image with the information stored in the database and verifies the identity of the voter. If the identity is verified, the voter is allowed to cast the vote; otherwise, an error message is displayed on the screen, and the person is not allowed to poll the vote. The system is designed to be secure and tamper-proof. The use of face recognition technology makes it difficult for anyone to impersonate another person and cast a fraudulent vote. The system also ensures that each voter can cast only one vote, and the voting process is conducted in a transparent and fair manner. Overall, the proposed online voting system offers numerous advantages over traditional paper-based voting systems, including increased efficiency, reduced cost, improved security, and transparency.

I. INTRODUCTION

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 contains of 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 also requires a lot of resources to conduct voting process. In this paper we have proposed online voting system to cast the vote using face recognition . The information about the Face is passed to the server unit for the further verification. Then the server checks for the data from the database and compares that data which already exists 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. As per the records of TOI 24 Jan, 2009 11 lakhs fake votes were observed in Delhi. Then according to India News June2013: 30000 illegal voters were found in election commission under Sheila Dikshit constituency. Another news which was alleged by LJP(LokJanshakti 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 contains of 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 also requires a lot of resources to conduct voting process. In this paper we have proposed online voting system to cast the vote using face recognition . The information about the Face is passed to the server unit for the 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.



Decentralized E-Voting Portal Using Blockchain, This paper represents frameworks of blockchain for the Evoting system. This implementation can be used for small scale elections such as board rooms or inside corporate houses elections. Smart contract from Ethereum is used for this implementation. The idea behind this implementation is to combine the technology of blockchain with the homomorphic encryption and secret sharing schemes for the decentralized voting applications safe from trusted third party. It gives the public and transparency voting process which protects the anonymity of voter's identity and the privacy of data transmission and verification of ballots during billing phase.

Electronic Voting Machine with Enhanced Security This paper describes the construction and design of voting machine using ATMEGA 32 microcontroller which has security of three extra layers. EVM takes a lot of time for the process of voting using ballot papers. So considering to the amount of time, manpower to be saved for extremely fast and reliable. So here implementation of the system is in such a way that voting secrecy is maintained without using ballot paper. VVPAT is currently used for voting machine which is expensive than EVM. EVM gives 100% proof of tamper, where results are just a click away. But this EVMs can be tampered easily by changing the hardware connections. So this paper proposes a three layered extra security.

Biometrically Secured Electronic Voting Machine In this paper, Arduino and Finger print scanner is used to implement the system which identifies each voter, also count votes and avoids fake votes. In this system voter is identified using FPS which detects if a person is a registered or not and also it denies for the voter to cast the second vote.

Multipurpose platform independent online voting system In this system the voter just needs to have a Aadhar card number and a smart phone which can scan the barcode implemented on the system. The user can vote on any location as it is totally online based application. This system creates its own voting ballot. The encryption of vote data is at the user's end and decryption is at the local administrator end. This makes the system more authenticated and secure for voting.

II. LITERATURE SURVEY

Several authors have put in efforts in the field of face recognition, significant contribution are briefed in the literature review. Vigorous technique [3] for naturally coordinating highlights in pictures comparing to the equivalent physical point on an item observed from two discretionary perspectives. Unlike conventional stereo matching approaches coordinating methodologies, the presumption like no earlier information about the relative camera positions and directions. Actually in this application this is the data wish to decide from the picture feature matches. Highlights are distinguished in two or more pictures and portrayed utilizing affine texture invariants.

The fundamental test is the way to improve the recognition performance when influenced by the fluctuation of non-linear effects that incorporate illumination variances, poses, facial expressions, occlusions and so on. A robust 4-layer Convolutional Neural Network (CNN) [4], engineering is proposed for the face acknowledgment issue, with an answer that is equipped for dealing with facial pictures that contain occlusions, poses, facial expressions. There are many face recognition algorithms, just a bunch of them meet the continuous limitations of a software based arrangement without utilizing any committed hardware engine. This paper presents a real-time and robust solution for mobile platforms [5], which in general have limited computation and memory resources as compared to PC platforms. This solution includes joining two previous real-time implementations for mobile platforms to address the shortcoming of each implementation.

The main execution gives an on the web or on-the-fly light source adjustment for the second usage which is seen as robust to various face postures or orientations. Pattern classification approach by considering every pixel in a image as a coordinate in a high-dimensional space is discussed in [6]. Along with the upside of the perception that the images of a specific face, under fluctuating illumination but fixed pose, lie in a 3D linear subspace of the high dimensional image space—if the face is a Lambertian surface without shadowing. In any case, since faces are not genuinely Lambertian surfaces and in fact produce self-shadowing; images will go deviate from this linear subspace. As opposed to explicitly projecting this deviation, linearly project the image into a subspace in a way which limits those regions of the face with huge deviation.

Design and execution of the component extraction strategy for Speeded-Up Robust Features (SURF) and Support Vector Machine (SVM) grouping technique into the traffic signs recognition application is deliberated in [7]. The yield of this application is the importance of the traffic sign with two languages, Indonesia and English. In the SURF strategy, the littlest huge number of key focuses will influence the accuracy level to perceive a picture. Face detection is



the premises of all the face processing system, while in video the face detection issue has more special importance. By examining the face detection dependent on Adaboost algorithm, this paper presents a quick and good robust face detection method.

Firstly, the motion region which contains faces is obtained based on motion detection, excluding the background interference. Secondly, Adaboost algorithm is used to detect the face in the motion region and locate the face. The experiments show that this method can rapidly and accurately detect human faces [8]. The face recognition and tracking and the advancement of the customer side of system uses Android cell phones. For the face recognition stage, Viola-Jones algorithm is used that isn't influenced by illuminations. The face tracking stage depends on Optical Flow algorithm. Optical Flow is implemented in the framework with two component extraction strategies, Fast Corner Features and Regular Features [9]. Real-time robust technique is created to distinguish irises on faces with coronal axis rotation within the normal range. The technique permits head movement without any limitations to the background. The technique depends on anthropometric templates applied to recognize the face and eyes. The template uses key features of the face, for example, elliptical shape, and location of the eyebrows, nose, and lips [10].

III. PROPOSED SYSTEM

Initially, user needs to register in the system by providing information such as Aadhar 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 for casting the vote, user needs to login to the system by entering Aadhar number and Password. After this user needs to answer security question. If it gets verified successfully the user moves on to the next page where he/she can select the candidate to cast the vote. After clicking the vote button the webcam gets on and verify face of the user from the prepared dataset. After successful verification of face e it will send message user's registered mobile number. It gets verified and casting of vote is successful.

System Modules

- User Module
- Administration Module
- Model Training
- Voting Process

Module Description

User Module

- User interface consists of a login first name and unique password using which he/she can login into the online voting system.
- will be complete by the administrator to the user.
- Once the user has logged in, he has the right to view the names of the candidates listed by the administrator, view the results once the termination dates of the election.
- The user module constitutes only one sub module.

Login

- Every one voter is provided with single username and password by hand by the administrator.
- The voters use the username and password for login and implement the fundamental right of voting. But incorrect username and password entered, the right to use to is denied to the user.
- Moreover also voter is allowed to vote only once. This is the safekeeping feature provided against external access of the system. Later than login the voter enters the voter home page, which provides the links

Candidate Registration

- The registration of the candidates in every constituency is done by the administrator. The features of the candidate contain name, address, gender, his/her constituency party and image.
- Through the candidate registration, candidate list with the certain information of the candidates.
- The candidate list can be viewed by admin and the vote within their respective homepages. According to candidates database (guide) each details of the candidates are store up in database controlled by the admin including candidate's particulars.



Administration Module

- Administrator interface consists of a login name and single password using which admin can login into the online voting system.
- Administrator has the key control of the system. Via logging into the page it can perform the following tasks.

View Result

- This provides user pleasant representation of the votes obtained by all candidate.
- It comprises the percentage of the votes obtained by each candidate..

Model Training

- Scatter Matrix plays a huge role in the process of dimensionality reduction. Corresponding Fisher Face is gets calculated as the next step by which the scatter matrix as input.
- lbph has superiority over Eigen faces because of the effort in maximise the separation between various domains or classes in the training pairs.
- Recognizer function has been derived from the calculated Fisher Face and this function is used for comparing the unique id with the actual inputs. Modules.

Registering the voting

- After completion of the face recognition module, next comes the module to register the vote.
- If the detected face has been recognized, then it marks the attendance in the excel sheet.

Face Detection using Haar Cascade

- Face detection, which is the major part of this project is done by using the Haar Cascade method which is a machine learning object detection algorithm used to identify objects in an image or video.
- The algorithm is trained to detect a face by using a lot of positive and negative images. Firstly, the picture is converted into a grey-scale, and then it detects Haar features-sequence of square-shaped functions.

Then it uses classifiers to detect the face (1) and not a face (0). This face detection happens in four stages. The first being, detection of Haar features, second being, using integral images, third stage is Adaboost and fourth is the cascade of classifiers

Voting Process

Image Procurement

- The initial step involved in the phase is image acquisition i.e., obtaining the face image of the students present in the classroom. It can be obtained through the High Definition Video Camera. From the video sequence, frames of each sequence are extracted from the video and numbered for further processing.

Face Detection

- From the extracted frames, each face image needs to be segregated. For this segregation purpose, we go with the process of face region bounding box methodology usually called marking the Region of Interest using HAAR cascade classifiers. After segregating the frame, the first frame is taken and the face image is detected and marked. Then the second frame is taken and the face image is detected and marked. The same process is repeated for all the available frames.

IV. SYSTEM REQUIREMENTS

Hardware requirements

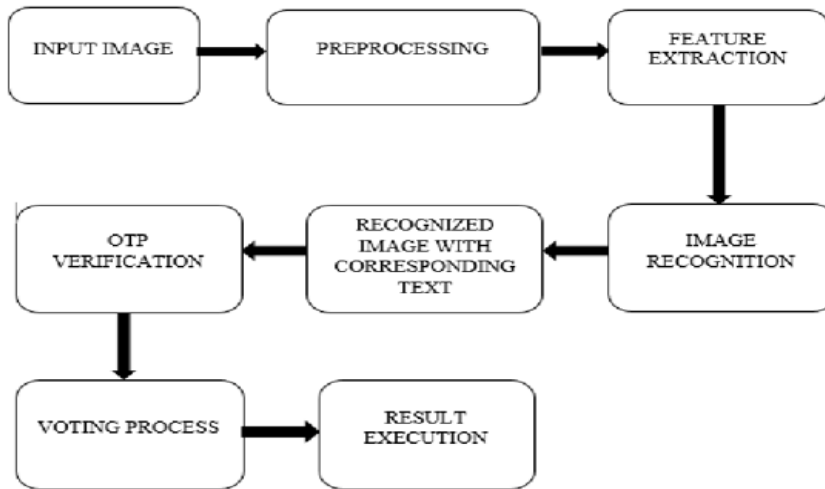
- Processor: Intel i3 above
- Speed: 3.19 GHZ
- RAM: minimum 4GB
- SSD: 10 GB above

Software requirements

- Operating System: Windows 10
- Front End: HTML & CSS
- Back End: Python
- Tool: Anaconda, Pycharm



V. ARCHITECTURE DIAGRAM



VI. RESULT

In this section, analyze the result of the proposed system. The screenshots are the results of the system.

Figure 6.1 Home Page



Figure 6.2 Admin Module





Figure 6.3 Add Nominee



Figure 6.4 Update Voter Details



Figure 6.5 Train Model

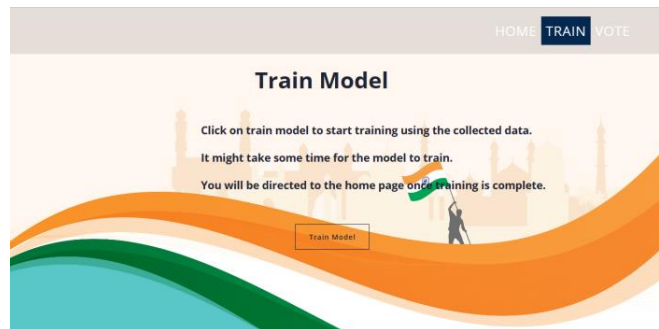
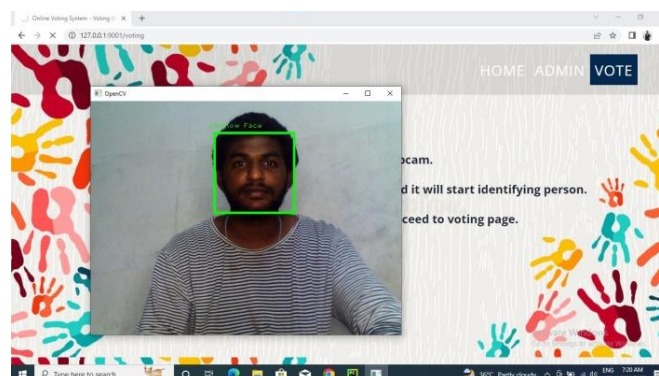


Figure 6.6 View Voting Result





VII. CONCLUSION

In conclusion, an online voting system that utilizes face recognition technology can offer a more efficient and secure method of casting votes. This system eliminates the need for paper ballots and manual counting, which can be time-consuming and costly. Instead, the system uses facial recognition to verify the identity of voters and prevent fraudulent activities.

However, it is important to note that implementing such a system would require significant investment in terms of infrastructure and security measures. The system must also be designed to ensure accessibility and usability for all voters, including those with disabilities.

VIII. FUTURE WORK

There are several ways in which an online voting system that utilizes face recognition technology can be enhanced in the future:

- Artificial Intelligence:** The use of artificial intelligence can help improve the accuracy and speed of the face recognition process. AI can also be used to identify patterns in voting behavior and detect potential fraudulent activities.
- Multi-factor Authentication:** Multi-factor authentication can be used to further enhance the security of the system. This could include using additional methods such as fingerprint recognition or SMS-based authentication.
- Improved Accessibility:** The system can be improved to make it more accessible for individuals with disabilities. This could involve using assistive technologies such as text-to-speech and voice recognition.

REFERENCES

- [1] "Online Voting Systems: A Review of Security Threats and Countermeasures" by Khalilov, Z., & Grushin, A. (2020).
- [2] "Security of Online Voting: Challenges and Solutions" by Neumann, S., & Volkamer, M. (2018).
- [3] "Privacy-Preserving Online Voting Based on Blockchain Technology" by Shen, J., Wu, X., Zhu, W., & Xu, X. (2020).
- [4] "Face Recognition: A Literature Survey" by Zhao, W., Chellappa, R., Phillips, P. J., & Rosenfeld, A. (2003).
- [5] "Face recognition: From traditional to deep learning techniques" by Rawat, Y. S., & Wang, Z. (2021).
- [6] "Enhancing Face Recognition Performance under Adverse Conditions: A Survey" by Wang, R., Shan, S., Chen, X., & Gao, W. (2021).
- [7] "Accessibility of Electronic Voting Systems: A Literature Review" by Bonneau, J., Schaechtle, U., & Volkamer, M. (2018).
- [8] "Usability Evaluation of Electronic Voting Systems: A Systematic Literature Review" by Schmitz, S., Roßnagel, A., & Schlieter, H. (2020).