

## **ELECTRONIC VOTING BASED ON FACE RECOGNITION FRAMEWORK**

Dr.S.Meera, Professor, Computer Science & Engineering, Agni College of Technology, Chennai,  
India

Dr.S.Geerthik, Associate Professor, Information Technology, Agni College of Technology, Chennai,  
India

Sankar S , Department of CSE, Agni College of Technology, Chennai, India

Ranjith Kumar S ,Department of CSE, Agni College of Technology, Chennai, India

PremKumar V ,Department of CSE, Agni College of Technology, Chennai, India

### **ABSTRACT:**

Electronic polling systems promise voters advantages such as accessibility and ease, allowing them to vote from any Internet-connected computer device anywhere in the world at any time. The Indian voting system now allows citizens to vote simply in their respective constituencies, which many people believe to be a time-consuming process. As a result, the number of persons voting decreases. The polling percentage of a country is significant since it reveals how genuine its current system is. To address this issue, we created the E voting system, which uses a face recognition method and is a highly safe, genuine system that allows only valid voters to vote even in remote locations throughout the world. This system uses trained algorithm to recognize face and authorizes the voters. This can prevent fraud votes and thus, provides legitimate voting results.

**Keywords:** Face Recognition, Electronic voting, Trained algorithm, Authentication.

### **INTRODUCTION**

India is the biggest majority rules system on the planet. The democratic period in India traverses just about a month and a half for the overall political decision and there is no elective framework that works for citizens who are at remote stations or who wish to cast a ballot however can't. do this because of arealimitations. There are additionally no extraordinary guidelines for the individuals who find it hard to cast a ballot face to face at the surveying station. additionally inclined to human mistake. Also, in COVID19 pandemic circumstances, holding customary elections is troublesome. Our framework is a face confirmation electronic democratic framework planned explicitly for administration electors who experience issues projecting their votes through the current framework. It furnishes electors with a proficient, advantageous and secure democratic component. The plan of this framework will make the democratic interaction more advantageous and subsequently can prompt better cooperation.

Face Recognition is the most extensively used biometric authentication for computer technologies, and voter fraud is one of the most fruitful methods since it prohibits people from voting numerous times under different identities and IDs. A large part of this problem can be overcome by identifying an individual's face and then determining whether it matches any of the voter's faces previously stored in the voter database, preventing duplicate votes. Face recognition is undeniably the most demanding and challenging computing technique due to a variety of parameters such as image background, illumination, face emotions, angles, and posture.

### **RELATED WORK**

The Existing system for voting process has been conducted in two ways most commonly. Ballot

voting is in use since voting has been started. Evm is currently in use recently.

**Ballot Voting** - A ballot is a mechanism that is used to cast votes in elections, and it can be a sheet of paper for secret voting. The voter is given a piece of paper that contains all of the party insignia as well as representative names. People go to the polling station, fill up the ballot paper, and vote by stamping the desired party symbol [1] . The ballot paper is then folded and placed in the ballot box. Finally, the officers of the Election Commission count the votes and declare the results[7].The ballot papers may be lost at the time of counting which may affect results of the particular area or people may miscount the number of votes which leads authority into wrong hands and this method is a hectic process and time consuming.

**EVM** - An electronic voting machine (EVM) is a voting machine. After completing the verification process, the voter approaches the EVM and votes by clicking the button next to the appropriate party symbol. The processes outlined above are insufficiently accurate because the possibility of false/fake voting exists[2]. EVM machines can get corrupted, causing polling to be temporarily stopped and a significant amount of time to be wasted. Sometimes, EVMs can be tampered with, causing the casted votes to be polled to a single candidate or party, even if the vote was cast for multiple candidates or parties. This may lead authority in the wrong hands[3][6]. They are also insecure because a individual's vote can be casted by another voter or even a stranger. This is referred to as a false voting. Despite the fact that there is relatively little false/fake voting, this little setback has the potential to influence the outcome.

The Drawbacks due to usage of these systems are as follows: Vote rigging are possible due to poor authentication method,Manual checks are time consuming and involves more manpower,Duplicate votes , Voting booth authorities can malpractice.

### **PROPOSED METHODOLOGY:**

Even though, EVM is currently in use all over the country. It still lacks in some factors in terms of providing secure voting environment. There is only manual authentication process so far and involves more manpower for authorizing the voters to cast in booth and it is time consuming. Our system eradicates that issue and reduces the time by introducing face recognition at the place of polling booth[4] [5]. It ensures only one person can vote at a time and eliminates vote rigging and making it difficult for fraud votes. This is implemented by face recognition library and mobile net v2 architecture These are the following phases involved in our system :

face detection, mask detection and finally face recognition.

Face detection works using deep learning techniques and mask detection is done by ssd architecture and face recognition is implemented using Face\_Recognition library.

The Advantages when we use our proposed are as follows: Only one person is allowed to vote, Authorizing the voter using face recognition provides more secure system, No duplication of votes, vote rigging is possible here, Reduces the time consuming and more automated system.

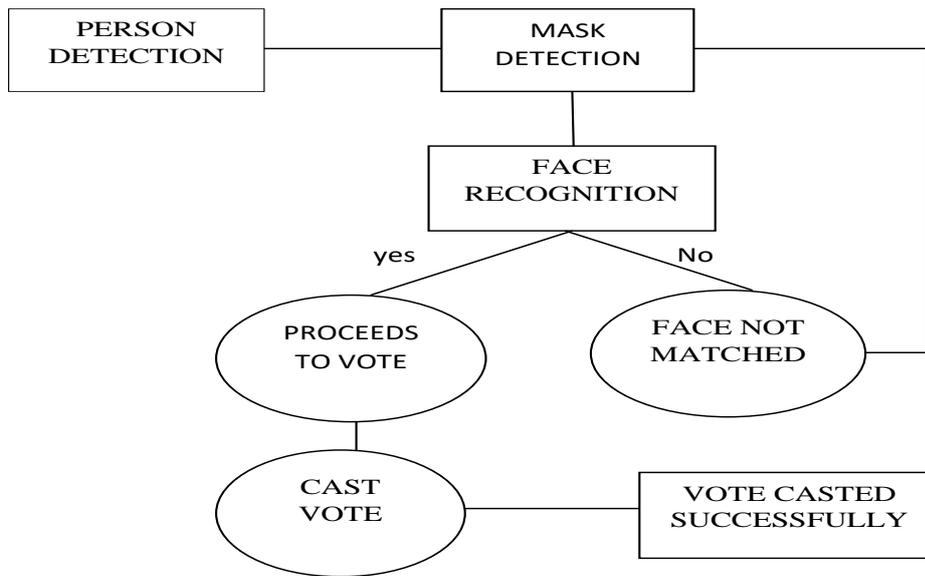


Figure 1. The Framework of Electronic Voting System based on Face Recognition

The architecture diagram shown in figure 1 represent the paper module which is designed using hardware and software, which is useful for people and the government. The Voting Process can be done in hassle free method with enhanced security, reduced manpower and time consumption to provide legitimate results for our nation.

### Person Detection Phase:

Object detection is one of the most significant accomplishments of deep learning and image processing since it discovers and recognises objects in pictures. Bounding boxes are one of the most prevalent methods for producing localizations for items. An object detection model may be trained to recognise and detect several objects, making it adaptable. The majority of object detection models are trained to recognise the presence of distinct items. Images, videos, and real-time processes can all benefit from the models created. Even before deep learning methodologies and sophisticated image processing capabilities, object recognition attracted people's interest. Object detection has some successful approaches such as SIFT, HOG's feature and many more. It has become considerably more widespread in the present generation because of adaptation of deep learning and computer vision technologies. The most recent generation of deep learning approaches for object identification appears to have no bounds. The same principle which has been implemented in the form of person detection. The person detection phase is to check only one person is allowed at a time.

The libraries used in this phase are following.

**Opencv:** OpenCV is a large open-source library for computer vision, machine learning, and image processing that currently plays an essential part in real-time operations, which are critical in today's systems. It may be used to detect objects, faces, and even human handwriting in photos and videos. Python can process the OpenCV array structure for analysis when it is combined with other modules such as NumPy. We employ vector space and execute mathematical operations on these characteristics

to identify visual patterns and their different features.

**Imutils:** A set of convenience functions for OpenCV and Python versions that make fundamental image processing operations like translation, rotation, scaling, skeletonization, displaying Matplotlib pictures, sorting contours, identifying edges is all will be done with the help of this package.

**Numpy:** NumPy is a Python package for array processing. It includes a high-performance multidimensional array object as well as utilities for manipulating them. It is the most important Python package for scientific computing. It's free and open-source software. Image are stored in a NumPy array.

### **Mask Detection Phase:**

In this phase, the Person will be checked if he/she is wearing a mask or not. To detect the mask, we have used mobilenet SSD (Single Shot MultiBox Detector) which is a popular algorithm in object detection and it is light weighted, faster than Faster RCNN[8][10]. Single-shot detector for multi-box predictions is one of the fastest ways to achieve the real-time computation of object detection tasks. While the Faster R-CNN methodologies can achieve high accuracies of prediction, the overall process is quite time-consuming and it requires the real-time task to run at about 7 frames per second, which is far from desirable[9]. The single-shot detector (SSD) solves this issue by improving the frames per second to almost five times more than the Faster R-CNN model. It removes the use of the region proposal network and instead makes use of multi-scale features and default boxes. We mainly prefer faster predictions on an image for detecting larger objects, where accuracy is not an extremely important concern[11][14]. However, for more accurate predictions for smaller and precise objects, other methods must be considered. It is a single convolution network that learns to predict bounding box locations and classify these locations in one pass[12][13]. Hence, SSD can be trained end-to-end and TensorFlow object detection API is the framework for creating a deep learning network that solves object detection problems.

### **Face Recognition Phase:**

The facial recognition step ensures that only valid voters in that constituency are authorized by capturing a live image from a camera. This will be verified against the database, and only then will it be permitted to proceed to the next level. i.e. to cast the vote. This is accomplished by training the model with the face\_recognition library. Face\_recognition library is used to locate features in the image that are uniquely specified. In most cases, the facial picture has been removed, cropped, scaled, and converted to grayscale. Face recognition involves following three steps namely, face detection, feature extraction, face recognition. Face encoding is a vector of values representing the important measurements between distinguishing features of a face like the distance between the eyes, the width of the forehead, etc. To train the images, we will place a list of images to recognize in a folder and load into the code to train. We loop through each of the images in our train directory, extract the name of the person in the image, calculate its face encoding vector and store the information in the respective lists. The images that we have selected should show the features of the face well enough for the classifier. The Encoded format file is used in the implementation code to recognize the image in live webcam with the display of names with their respective images.

### **EXPERIMENTAL RESULT:**

The prototype has implemented using python and flask,The first stage of the implementation was to detect the person whether multiple persons enters or not. This phase allows only one person at a time. The Second Phase is to detect whether the person wears mask and ask to remove it. This is incorporated into our system because of covid situation. The Final Phase Face Recognition is basically recognize the faces which is available in the database for their respective constituency will show. If the face matches with the names, It will allow you to vote.The fig 2 shows Face Dectetionmodule,fig3 shows mask detection module, fig4 shows face recognition and fig5 shows voting module.



Fig2: Face Detection Module



Fig 3: Mask Detection Module



Fig 4. Face Recognition Module



Fig 5. Voting Module

## **CONCLUSION:**

The main objective of this project was to design and construct a secure and more automated system to reduce time consumption while voting. The system was designed and developed in such a way that, it can validate only one person at a time while polling in a booth. An accurate face recognition system is created using libraries and models. In this study, human facial recognition is extremely important. Accurate algorithms and high-quality face recognition results may be produced using the approaches outlined in this research. Furthermore, using the ssd and face recognition models, high-performance levels in detecting human faces and analysing facial characteristics may be achieved, even in settings with complicated backdrops. Some extra features were also introduced and included to the system to convince its flexibility, enhancement and for security. Overall the project was designed in such a way that, will be easy to operate and user-friendly to use and it will help to produce the legitimate election results.

## **REFERENCES**

- [1] S. Kumar and E. Walia, "Analysis of electronic voting system in various countries," *International Journal on Computer Science and Engineering*, vol. 3, no. 5, pp. 1825–1830, 2011
- [2] D. Nikam, D. Shetiye, and D. Bhoite, "A critical study of electronic voting machine evm utilization in election procedure," *International Journal of Trend in Scientific Research and Development*, vol. Special Issue, pp. 1–3, 03 2019.
- [3] S. Ravi and D. P. Mankame, "Multimodal biometric approach using fingerprint, face and enhanced iris features recognition," in *2013 International Conference on Circuits, Power and Computing Technologies (ICCPCT)*. IEEE, 2013, pp. 1143–1150.
- [4] D. Menotti, G. Chiachia, A. Pinto, W. R. Schwartz, H. Pedrini, A. X. Falcao, and A. Rocha, "Deep representations for iris, face, and fingerprint spoofing detection," *IEEE Transactions on Information Forensics and Security*, vol. 10, no. 4, pp. 864–879, 2015.
- [5] J. Soldera, G. Schu, L. R. Schardosim, and E. T. Beltrao, "Facial biometrics and applications," *IEEE Instrumentation & Measurement Magazine*, vol. 20, no. 2, pp. 4–30, 2017.
- [6] J. P. Jose, P. Poornima, and K. M. Kumar, "A novel method for color face recognition using knn classifier," in *2012 International Conference on Computing, Communication and Applications*, 2012, pp. 1–3.
- [7] S. A. Perera, "A Comparison of SIFT, SURF and ORB.," Jan. 17, 2020. D. Tyagi, "Introduction to FAST (Features from Accelerated Segment Test)," Nov.
- [8] Chandra Keerthi Pothina, Atla Indu Reddy "Smart Voting System using Facial Detection" *IEEE Journal*, April 2020.
- [9] Anurag Chowdhury, Simon Kirchgasser, Andreas Uhl, Arun Ross, "CNN Automatically Learn the Significance Of Minutiae Points for Fingerprint Matching?" *IEEE Conference*, Mar 2020.
- [10] Samarth Agarwal, Afreen Haider, "Biometrics Based Secured Remote Electronic Voting System". *IEEE Conference*, Sep 2020.
- [11] Suresh Kumar, Tamil Selvan G M, "Block chain Based Secure Voting System Using Lot", *IEEE Journal*, JAN 2020.

- [12] Chengsheng, Yuan, Zhihua, Xia, “Fingerprint Liveness Detection using an improved CNNwith image Scale Equalization” IEEE Journal 2019.
- [13] Hui Xui, Miao Qi, “Multimodal Biometrics Based on Convolutional Neural Networks by Two-Layer Fusion” IEEE Conferences 2019.
- [14] Abdelleratif El Idrissi, Youssef El Merabet, “Plamprint Recognition using state-of the artLocal texture descriptors.” IEEE Conferences 2020.