A Novel Hybrid Voting System Using Machine Learning

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Abstract: *In this proposed system a facial and fingerprint recognition-based technique is implemented. This technique uses computer vision and machine learning algorithms for the recognition of faces. The goal is to make the voting process safe, secure and easy to use. This system will eliminate the need for voting booths and electoral votes. The system will also be much more helpful for the voters because they don't need to stand in a long queue to cast their vote. The proposed system uses an Android mobile phone to capture the user photo and the python server in the backend performs facial recognition. The system is much safer than the traditional system and also saves money which is usually spent during the election process. It also eliminates the need for human resources and time for managing the voting system.*

Keywords: Voting System, Facial and Fingerprint recognition, Machine learning, Android mobile

I. INTRODUCTION

In an ever-growing population in every county especially in India casting votes by every eligible citizen takes time, effort and human resource, since India is a democratic country people can choose the person of their choice through the election procedure. Because of this the election has to be conducted securely and without any compromise. One of the major drawbacks of the traditional system is that it requires labor and human resources for maintaining the election process, criminals can also take advantage of the drawbacks of the traditional system to cast fake votes and perform some illegal operations during the voting process.

The traditional system has many more drawbacks, the voting machines in the voting booth are not reliable and are prone to breaking, in voting places there will be chances of violence and violence can lead to damaged voting machines, to minimize the violence police have to be in the surroundings of the voting booth. People need to stand in a queue in order to cast their vote which is a time consuming process. It also requires human resources for arranging and maintaining the voting booth. For the election process to occur it needs a certain amount of space, it is usually held in schools or colleges, the premises have to be vacated for the election, the elderly and disabled people refuse to vote since the voters have to be in person at the voting terminal.

The proposed system eliminates some of the drawbacks present in the traditional system by utilizing advancement in recent technology, the proposed system uses a facial recognition system which is safer, easier to use and secure than the traditional system. In our proposed solution facial recognition based voting system is proposed which uses machine learning and computer vision to detect and recognize the face, the proposed system uses an Android mobile phone to capture the user photo and the python server in the backend performs facial recognition, since now a days everyone has a smartphone, we are taking advantage of this smart device to perform voting systems.

II. LITERATURE SURVEY

Chandra keerthi pothina et al. [1] This System fully based on web development, here both face detection and recognition are done, duplication of the vote can be lower by using detection technology. Girish H S et al. [2] proposed system gives canter of attention on the biometric security, it takes aadhar number as proof for voting by using fingerprint recognition technology. The EVM and Fingerprint Scanner play important role in the system

Rajesh M et al. [6] proposes an Online based voting system which is more secure than traditional based voting systems, the system uses users fingerprint authentication technology as well as aadhar number verification for secure voting. The two factor authentication based security solution for the voting system will help in preventing fake votes and makes the

voting system much more secure and reliable. Rudrappa B et al. [7] proposed a solution which uses users fingerprint to authenticate the user. These fingerprint sensor modules are installed in the electronic voting machines, and this system uses a Liquid Crystal Display to show the status of the system. Shah D H et al. [8] a proposed which uses Elastic Bunch Graph Matching for the detection and recognition of faces, the system performs the operation by extracting the users facial data using Gabor jets, the Gabor jets extracts facial data such as size of eyes, nose, mouth and chin. These extracted facial data are stored in the database. Smith Khainar et al. [9] emphasizes the security of the online voting System, to increase the security of the traditional electronic based voting system, multiple security protocols have been implemented, includes biometric authentication, steganographic authentication, homomorphism encryption, blind signature.

Sun Y et al. [10] in his working discussed various different patterns of the human face. They performed this analysis using a 3D model of the human face and author finally concluded that the proposed algorithm performs much better compared to traditional based hidden markov models. Varshita K S et al. [11] The system based on the only face recognition using android mobile, the facially recognition done by using Histogram of oriented gradients which is help the machine to find faces in an image.

III. PROPOSED METHODOLOGY

The overall system architecture designed by using mainly three languages are python, mysql and java in addition to whole proposed system is controlled by Android application so that used software are python IDLE and Android Studio and in this System internet play a very important role because both Laptop and android mobile connect through same network, the android mobile used to cast the vote.

The proposed system must follow the below mentioned steps are
1. Registration phase.
2. Train up the Machine by using encoded file.
3. Fingerprint and facial recognition using CNN algorithm and OTP generation.
4. Cast vote.

3.1 Registration Phase

The registration phase system design is shown in below figure1. In the registration phase1 of the system design, when the user visits the municipal office for voter registration, the authority asks for name and email, once the user gives the documentation, the authority verifies the documents, at one time document are verified successfully. The authority register the user to the database, formerly the user is registered successfully, the login credential will be sent to the registered email id, the above process is depicted using the following diagram.
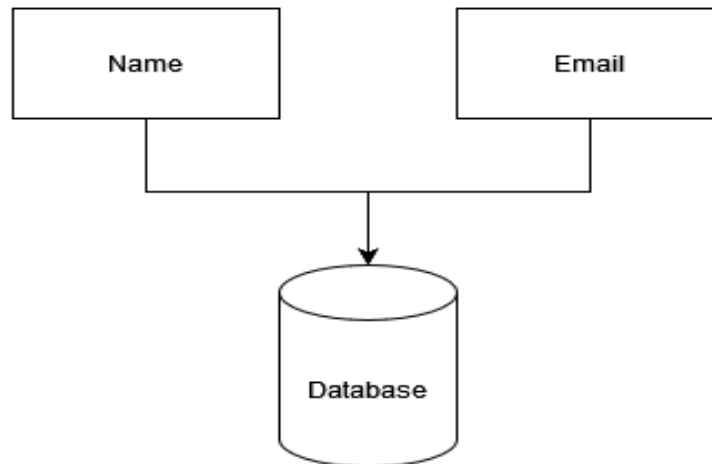

Figure 1: Registration phase1

3.2 Train up Machine by using Encoded file

Neural network will go through every image of the user and extracts the users facial details such as nose, chin, mouth, eyes. Based on these extracted features the system will be trained and a trained encoded file will be generated.

A. Convolutional Neural Network Algorithm

The Convolutional Neural Network is inspired by the visual system of human beings, the entire Convolutional Neural Network is designed similar to the human brain and it works like a human brain along with the Convolutional Neural Network consists of neurons just like the brain of a living being and it is mainly used in classification and detection processes, the Convolutional Neural Network is also known as ConvNet. The Convolutional Neural Network uses feed forward architecture, which is a type of Artificial Neural Network, the Convolutional Neural Network consists of neural layers which will process and learn based on the given input.

In the phase2 of the registration, the authority will capture the photos for training purpose. The authority will capture 10 images of the user, after capturing the images it is then trained using a convolutional neural network, Where the neural network will go through every image of the user and extracts the users facial details such as nose, chin, mouth, eyes. Based on these extracted features the system will be trained and a trained encoded file will be generated, which is shown in the following figure2.
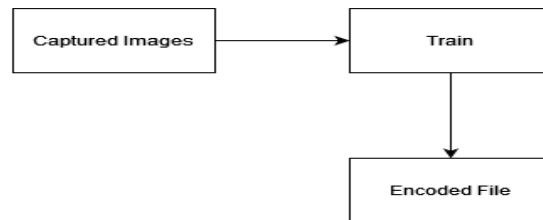

Figure 2: Registration phase2

3.3 Facial and Fingerprint Recognition and Generation OTP

The login phase is shown in the below figure3. The login phase is performed using an Android based Smartphone, the android application incorporates fingerprint authentication system, the user needs to authenticate themselves using fingerprint whether the fingerprint doesn't match with the fingerprint stored in the mobile phone it will show the toast message which will say "fingerprint does not match". If the user fingerprint matches the android application will show next activity, the next activity contains login activity. in the login activity, the user needs to enter the username and password received in the inbox, whenever the login details matches with the database it will move to the next activity or else it doesn't move, once the user logins successfully done the android application will show the next activity which is image capture activity, in the image capture activity, the user needs to capture the facial image of themselves, after the image are captured, the captured images will be uploaded to the server. Once the server receives the user's facial image, the system performs facial recognition, during facial recognition process, if the system recognizes the user's facial image, the system will send the OTP to the user's registered email address, at the user end the user needs to enter the received OTP from the inbox, in the android application if the OTP entered by the user is invalid the android application will not move to the next activity.
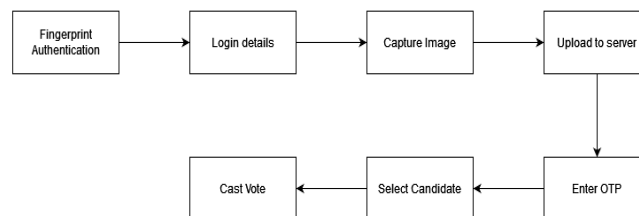
3.4 Cast Vote

Figure 3: Login phase

If the entered OTP is correct, the android application will show the list of candidate in the next activity, in the candidate list activity the user can only choose only one candidate from the list, after choosing the preferred candidate, the user can press the submit button, after submitting the vote, the candidate's corresponding vote count will be incremented.

IV. EXPERIMENTAL RESULTS AND ANALYSIS

4.1 Analysis

The following is the comparison table between the work done in proposed project and others. The work is embedded with facial recognition and fingerprint recognition to increase its accuracy. Hence the proposed work is more reliable compared to others.

| *Methodology*	*Disadvantages*	**Accuracy**
Sun Y et al. [10] using 3-D model	Multiple cameras are used.	96.35%
Shah D H et al. [8] using Elastic Bunch Graph Matching Technology	Only face recognition is implemented.	84%
Rajesh M et al. [6] uses Fingerprint authentication technology	Only fingerprint authentication is implemented.	90%
Proposed Methodology(CNN Algorithm)	Advantages: Single camera is used. Both face and fingerprint technology are implemented.	**98.3%**

Table1: Analysis of Success Rate
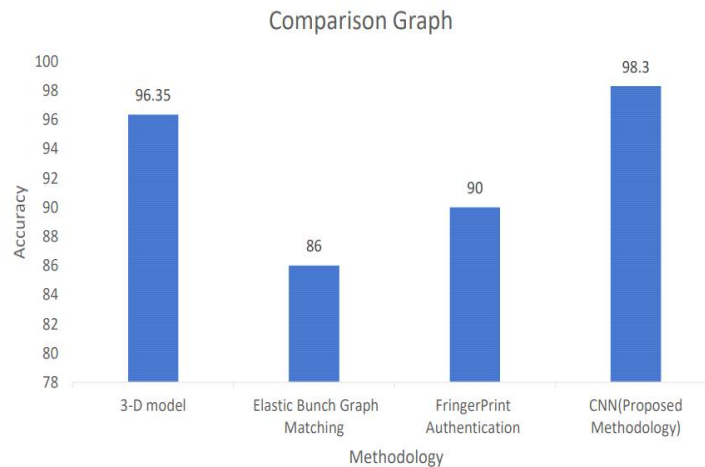
Figure 4: Bar chart comparison of the proposed methodology

4.2. Results

The voting based upon android is designed by using java language and all software related codes are implemented using android studio, the overall project start by adding voter details like name and email by capture image of the voter as shown in below figure5, all the voter details are stored in the database.

Figure 5: Registration phase

Figure 6: Image capture

After registration phase Train up the machine by using CNN algorithm, the image is automatically trained by machine itself, the for most first step in android mobile is to place the fingerprint, if the fingerprint matches then it proceeds to the next activity, whether fingerprint doesn't match then it show message as "invalid value".

Figure 7: Place your fingerprint

Afterwards fingerprint matches successfully then next activity is to enter the login details, if login details are entered correct then it move to the next activity whether the entered login details doesn't match the text appears as "invalid user"
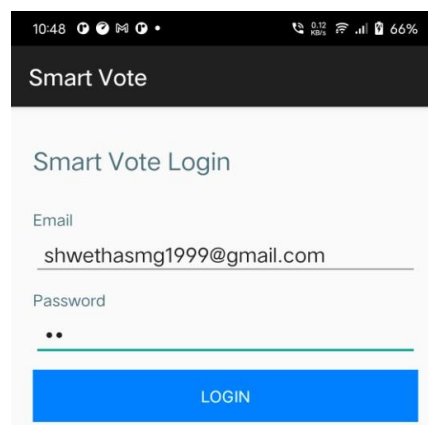

Figure 8: Login details

After login successfully then it allows to upload image to the server, then the proposed system manually upload the image by taking picture from android mobile, if the image matches correctly then it lead to the next activity.
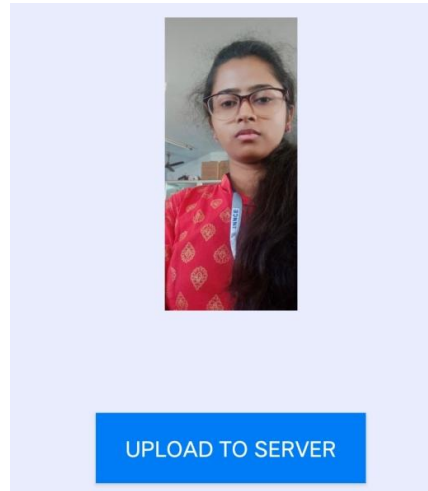

Figure 9: Upload image

In the next step OTP generate automatically to the registered email id, the OTP is entered correctly by voter then the proposed system verify the entered OTP is correct or not and then it displays voter's list to vote.
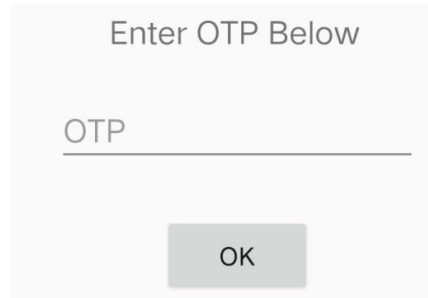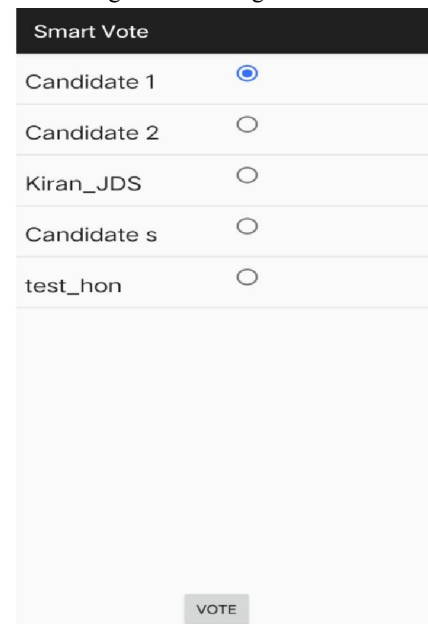

Figure 10: OTP generation

Figure 11: Voter list

The proposed system allow to choose one only candidate from list then click the vote button for voting, finally it display the message like thank you for voting.
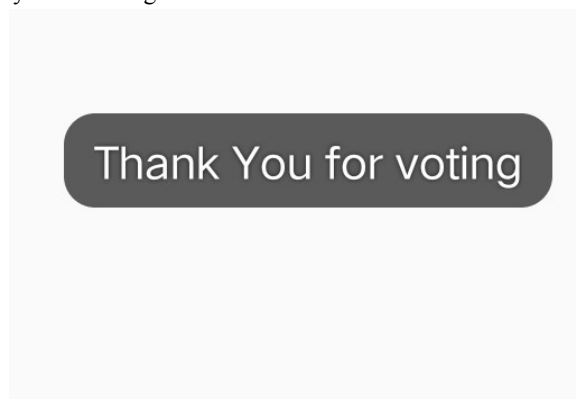

Figure 12: After completion of voting

V. CONCLUSION

In each and every country democracy takes place where people have to choose and elect the candidates, these candidates then have to develop their country. So, elections play a vital role in electing the right candidate for their country where people have to choose and vote for their candidates, due to the increase in population, identification of fake voting is getting more complicated each year, the only proof of identification is just a voter id, due to this there has been difficulty in identifying fake voters.

To overcome this issue, the proposed project uses a fingerprint and facial recognition system using machine learning technology in order to recognize the face and will be allowed to vote. The android mobile application captures the voter's face and will be sent to the server where the facial recognition takes place, if the match is found then the OTP (One Time Password) will be sent to the user's email address, after entering the correct OTP then the user will be allowed to vote, this proposed system is secure and will eliminate any fake voters finally the proposed system shows the accuracy of 98.3% so that the proposed system works well in real time application

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REFERENCES

[1]. Abbas Behrainwala, Amar Saxena,Ishika Navlani,Sakshi Sahay, Noshir Tarapore,Smart voting system using facial recongnitionInternatinal Journal for Research in Applied Science & Engineering Technology(IJRASET).ISSN 2321-9653,Volume 10 Issue 1 Jan 2022.

[2]. Chandra keerthi pothina, Atla Indu Reddy, Ravikumar C V, Smart voting system using Facial Detection International Journal of Innovative Technology an Exploring Engineering (IJITEE), ISSN:2278-3075, Volume-9, Issue-6 april 2020.

[3]. Girish H S,Gowtham R, Harsha K N ,Manjunatha B, Smart Voting System International Research journal of engineering Technnology(IRJET), ISSN:2395-0072, volume:06, Issue 05 MAy 2019.

[4]. Mahalakshmi Mabla Naik, Dr.Preethi N Patil, Smart Voting Through Face Recognition,International Journal of Creative Research Throghts(IJCRT)

[5]. Nadar Rajkani Pau;raj, G Rajagopalan, M Rajesh,S.V Kiruthika, I Jasmine A/P International Journal of Innovative Technology an Exploring Engineering(IJITEE), ISSN:2278-01081, NCIECC-2017 Conference proceeding.

[6]. Rajesh M, Ghadi, Priyanka, Shelar, online voting system.

[7]. Rudrappa B, Gujanatti 2015, A fingerprint print based voting system, Internatinal Journal of engineering Research & Technology(IJERT).

[8]. Shah D H , Shah D J and Shah D T V,2014,The Exploration of Face Recognition Techniques, International Journal of Application or Innovation in Engg and management(IJAIEM).

[9]. Smita Khainar, Reena Kharat, survey on secure online voting system.

[10]. Sun Y, Chen X, Rosato M and Yin L 2010 Tracking vertex flow and model adaptation for 3-dimensional spatiotemporal face analysis, IEEE Transactions on systems ,Man and Cybernetics-part:Sytems and Humans 40(3), pp.461-474.

[11]. Varshita K S, Nirmala Shivanand , Android Mobile based voting System through Facial Recongnition.