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Real Time Face Recognition in Electronic Voting System using RFID and OpenCV

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Abstract: *In this concept, the system is using most advanced and secure way of e-voting. In this, system actually use two steps for verification of the voters during the voting session, one is RFID data verification of voters and followed by successful face authentication will allow the voters to vote for their desired candidate using Haar Cascade Algorithm. These two authentication process will definitely reduce the piracy issues of voters and counterfeit vote. In India, there are two types of voting in practice. They are secret Ballet paper and Electronic Voting Machines (EVM), but both of the process has some limitation or demerits. The current voting system is not secure and time consuming as well. The people who are not eligible to vote can also cast their votes by unwanted means, which may cause various problems. In India, Computerized voting system has not yet been implemented. So, initiating this system we are proposing a way for voting which will be more effective. Here we have two level of security in voting process. The first level is the verification of RFID number and second level is face recognition. The security level of our system has been highly improved by the use of new method for each voter. The authentication of the user in the system is improved by using face recognition in the application, which will be able to identify whether the user is authenticated user or not.*

Keywords: RFID, Haar Cascade Algorithm, Unique number, aunthentication, counterfeit vote.

1. INTRODUCTION

Electronic voting machine has already been developed and widely used in many developed countries. But during the election time, verification process takes a lot more time and there is possible to occur counterfeit vote.

In India, they are using two types of method for voting. The first method is secret ballot paper, in which many papers are used and second method is EVM (electronic voting machine) which is in use since 2003. We need to propose a computerised voting system which is more secure than the existing one. In this, face recognition is used which will used to detect the right person that is stored in database. In our proposed system, we are using two types of verification for voters. The first one is RFID number verification, if your election commission id number is correct in RFID Data Verification then you have to go for Second level of security which is the main security level where the system recognize the face of the real voter from the current database of face images given by the election commission which is already connected with RFID. Finally, the images taken is matched with the images stored in the database, then the voters can cast their voting in the election. As you know that in the existing system there is no much secure in voting because here the only source of security level is the voter id which can easily be accessed by the other person by getting their voter id card. By keeping this in mind we are proposing new level of security which is much more secure than the existing system.

2. LITERATURE SURVEY

1) DIP BASED SMART ELECTRONIC VOTING MACHINE

With the inclusion of biometric fingerprint sensor, each voter is entered into the system only after being recognized and checked with the given database of enlisted voters. Once the corresponding fingerprint is matched with the information provided, the voter will be allowed to proceed for choosing their preferred candidate from the panel of buttons. The final vote is then displayed onto a LCD for the satisfaction of voters. The disadvantage of this was current method of the voting system was easily hacked.

2) DESIGN AND IMPLEMENTATION OF MICROPROCESSOR BASED ELECTRONIC VOTING SYSTEM

The vote casting system is almost similar to traditional system, only ballot box will be replaced by the device. The machine uses voter ID that is to identify a valid voter and restrict multiple vote casting. The main disadvantage of this is that image is not clearly recognised.

3) SMART VOTING SYSTEM USING BIOMETRIC SENSORS

At the time of voting, the user can specify their id and password. To ensure more security, finger prints of the voter is used as the main authentication resource. Since the finger pattern of each human being is different, the voter can be easily authenticated. The systems allow the voter to vote through his fingerprint. Finger print is used to uniquely identify the user. The finger print minutiae features are different for each human being. Finger print is used as a authentication of the voters. The negative part of this system is that they were be used to the Counterfeit vote.

4) DESIGNING AN ENERGY MONITORING, ANALYSING AND SOLUTION PROVIDING SYSTEM FOR ENERGY AUDITING

This can be viewed as a network of different devices which connects devices such as computers and smart phones and enables these devices to collect, monitor and exchange data. The system is remotely accessible through internet and is available in 24x7.This also includes Data acquisition and transferring, Data storing and processing, Web application development and report generation, Emergency situation detection. The main drawback is that this system makes a problem of counterfeit vote.

3. STUDY OF VOTING SYSTEM

I. PROPOSED SYSTEM

In this project we are working with three different stages

1) Level 1: RFID number. At the time of voter registration, system will request for the unique id from the voter. Unique id is verified from the database provided by the election commission.

2) Level 2: Face recognition with respective election commission id number. In this level, Haar Cascade algorithm is used to verify the facial image of the voters from the database provided by the election commission.

3) Level 3: If the Face recognition is successful then face authentication will allow to vote for their desired candidate.

II. IMPLEMENTATION OF THE MODEL

1. Every New User in the India will first register for Voting. So, our first step will be registration.

2. At that time of Registration, System Capture the Face of the user by using Web Camera and Store the Face sample with RFID (Adhaar) in the Server Database for Security Purpose.

3. At the time of election, we will use two level of security first one is RFID id verification and voter id verification and second one is face recognition.

4. System will be checking whatever unique id and voter id entered by the voter is correct or not.

5. If unique (RFID) id or voter id is correct, then system will take the image of voter and compare with the respective image with database or server.

6. If the image in database is matched with the captured image of the voter, then he/she is allowed to cast their vote.

7. On the voting page, all the party whatever party contest in the election symbols /buttons will be there. Voter can cast his /her vote in the election.

8. As soon as voter will fetch their vote, the id of voter logout automatically so we can say that a voter can give only one vote (Auto refresh).

9. On counting form only election commission authorized, user can login with the secure id and password. If both id and password is correct then voting process will be continued.

III. DESIGN / METHODOLOGY

This proposed concept is a web-based system so basic features related with web-based technologies such as client-server, database, image processing properties determine the software requirement of the system.

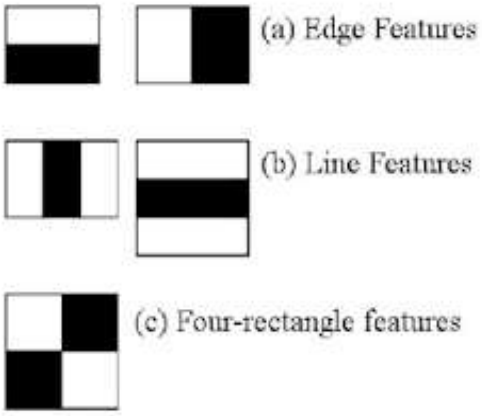
The software product is a standalone system and it is not the part of larger system. The system will be made up of two parts. Before the Election Day the application is used for general purposes such as viewing candidates profile and election results in past years. The voter is verified using face recognition technology used. These votes are accepted by the system on the server. The Election Commission Authority arranges the whole system according to its requirements on the server where the system is running.

IV. FACE DETECTION USING HAAR CASCADES

Object Detection using Haar feature-based cascade classifiers is an effective object detection method proposed by Paul Viola and Michael Jones in their paper, “Rapid Object Detection using a Boosted Cascade of Simple Features” in 2001. It is a machine learning based approach

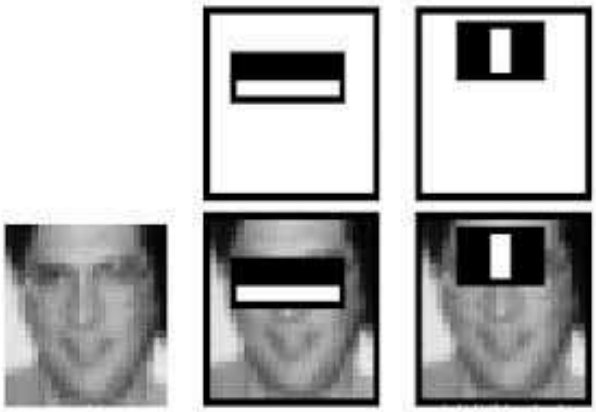
where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images.

Here we will work with face detection. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in below image are used. They are just like our convolutional kernel. Each feature is a single value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.



Now all possible sizes and locations of each kernel is used to calculate plenty of features. (Just imagine how much computation it needs? Even a 24x24 window results over 160000 features).For each feature calculation, we need to find sum of pixels under white and black rectangles. To solve this, they introduced the integral images. It simplifies calculation of sum of pixels, how large may be the number of pixels, to an operation involving just four pixels. Nice, isn't it? It makes things super-fast.

But among all these features we calculated, most of them are irrelevant. For example, consider the image below. Top row shows two good features. The first feature selected seems to focus on the property that the region of the eyes is oen darker than the region of the nose and cheeks. The second feature selected relies on the property that the eyes are darker than the bridge of the nose. For this, we apply each and every feature on all the training images. For each feature, it finds the best threshold which will classify the faces to positive and negative. But obviously, there will be errors or misclassifications. We select the features with minimum error rate, which means they are the features that best classifies the face and non-face images.



For this, we apply each and every feature on all the training images. For each feature, it finds the best threshold which will classify the faces to positive and negative. But obviously, there will be errors or misclassifications. We select the features with minimum error rate, which means they are the features that best classifies the face and non-face images. The process is not as simple as this. Each image is given an equal weight in the beginning. After each classification, weights of misclassified images are increased. Then again same process is done. New error rates are calculated. Also new weights. The process is continued until required accuracy or error rate is achieved or required number of features are found.

Final classifier is a weighted sum of these weak classifiers. It is called weak because it alone can't classify the image, but together with others forms a strong classifier. The paper says even 200 features provide detection with 95% accuracy. Their final setup had around 6000 features.

V. RESULTS AND DISCUSSIONS

As we see that existing voting system has many defects such as lengthy process, time taking, not secure, bogus voting, no security level but now we can say that our approach is more useful and secure from the existing system. Highly secured because in this project we have to use face recognition and face comparison so false user can't give votes. We can access result (counting) faster than existing system. Because ballet system takes much more time in counting process. But this computerized voting system increases the trust in voting system as well as Election Commission. Still there remains some limitations and drawbacks in this voting System.

4. CONCLUSION

As we see that existing voting system has many defects such as lengthy process, time taking, not secure, bogus voting, no security level but now we can say that our

approach is more useful and secure from the existing system. Since, we are using three level of security in this proposed system the false voters can be easily identified. The facial authentication technique is very much useful in identifying the fraud voters, so we can avoid the bogus votes during election commission. As every operation is performed through internet connectivity so, it is onetime investment for government. As data is stored in centralized repository so, data is accessible at any time as well as backup of the data is possible. Smart voting system provides updated result at each and every minute. Also requires less man power and resources. The database needs to be updated every year or before election so that new eligible citizens may be enrolled and those who are dead are removed from the voter list.

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