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E-Voting Using Android Mobile

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Abstract: ***As we know in urban areas voting is the major issue as the identification of the person is the most important issue as they do not have mostly the identity proof rather than the voting card and fake voting is done on a large scale. To avoid this we are developing this project which will store the identity of the voters and at the time of voting this identity will be matched using the facial recognition system which we are developing on the Android TAB or the Android Mobile to avoid the fake voting. This system will capture the face of the voter and match with the existing faces in the stored database.***

After the confirmation of the valid face detected, an OTP will be generated and send to the voters registered mobile and then he will use that provided OTP and then only his validation is succeeded and allowed to vote. This is fast and also helpful for the authorities to quickly do the verification and run the voting fast. So people should not waste their time in waiting in a queue for long time for doing vote. Also we are using voting-based content algorithm for providing bandwidth utilization for face matching and recognizing, this will provide optimized response time for voting system when it is used by many people at a time. Thus, this will help the percentage of voting to be increased as they are free quickly doing voting and will also help a right candidate to be selected.

Keywords: Spontaneous facial expression, Eigenface, Principal Component Analysis (PCA).

I. INTRODUCTION

As the modern communications and Internet, now a day all people are almost accessible electronically, the computer technology users, brings the increasing need for electronic services and their security. Usages of new technology in the voting process improve the elections in natural. This new technology refers to electronic voting systems where all election data is recorded, stored and processed primarily as digital information. Now a day security is very important. In the past, usually, mostly in military and government institutions need too much security. But, now need for this type of security is growing in everyday usage. In computing, e-services and information security it is necessary to ensure that data, communications or documents are enough secure and privacy enabled. Advances in cryptographic techniques allow pretty good privacy on e-voting systems. [5]

Security is a heart of e-voting process. Therefore the necessity of designing a secure e-voting system is very important. Usually, mechanisms that ensure the security and privacy of an election can be time-consuming, expensive for election administrators, and inconvenient for voters. There are various different levels of e-voting with different security. Therefore serious measures must be taken to keep it out of public domain. Also, security must be applied to hide votes from publicity. There is no measurement for acceptable security level, because the level depends on type of the information. An acceptable security level is always a compromise between usability and strength of security method.

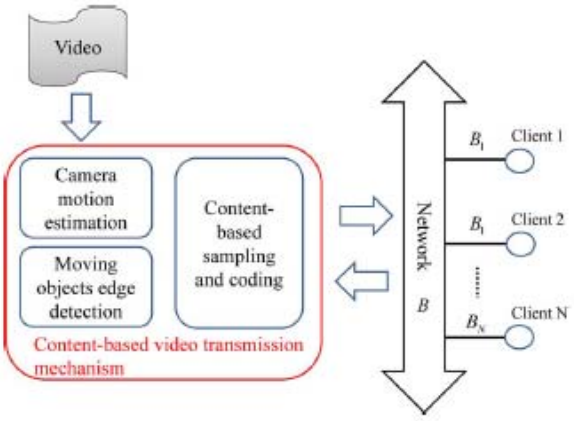

Fig. 1 The block diagram of the proposed content-based video transmission mechanism for efficient video transmission. Parameter denotes the bandwidth of each individual channel.

Fig. 1 shows the overall procedure for accomplishing the real-time video transmission, including camera motion estimation, edge detection of moving objects, and content-based sampling and coding. The apparent motion of pixels induced by camera motion is assumed to be identical and has only pixel-shifting in the image plane. The global camera motion is decided by estimating the consistency from the motion vectors determined by the edge feature of static objects/background. [9] Finally, the content- based sampling and coding mechanism is executed to guarantee the visual information of moving objects to be transmitted to clients under different available bandwidth conditions.

II. LITERATURE SURVEY

The use of computers or computerized voting equipment to cast ballots in an election is nothing but Electronic voting. Sometimes, this term is used more specifically to refer to voting that takes place over the Internet. Registration of voters, tally ballots, and record votes all operations performed by Electronic systems.

Voting technology in order to prevent a recurrence of the problems that threatened the 2000 U. S. Presidential Elections. The report assesses the magnitude of the problems, their root causes and how technology can reduce them. Here, the vote generation machine can be proprietary whereas the vote casting machine must be open-source and thoroughly verified and certified for correctness and security. Finally, the report provides a set of short-term and long-term recommendations on the various issues related to voting. They address a wide range of “What is” issues including voting procedures, voting equipment, voter registration, polling places, absentee and early voting, ballot security, cost and public finance of elections, etc. They then propose a novel “What could be” framework for voting technology and propose that a process for innovation be setup. The framework is “A Modular Voting Architecture [4] in which vote generation is performed separately from vote casting.

In “Electronic Voting” [7], Rivest addresses some issues like the “secure platform problem” and the (im) possibility of giving a receipt to the voter. Wide-scale attacks while voting from home, the need for extreme simplicity of voting equipment, the importance of audit-trails, support for disabled voters, security problems of absentee ballots, etc.

The NSF Internet Voting Report [8] addresses the feasibility of different forms of Internet voting from both the technical and social science perspectives, and defines a research agenda to pursue if Internet voting is to be viable in the future. Internet voting is differentiating in three categories as follows:

Poll-site Internet voting:

It provides greater convenience and efficiency in that voters could cast their ballots from any poll site, and the tallying process would be both fast and certain. More importantly, since election officials would control both the voting platform and the physical environment. Managing the security risks of such systems is feasible.

Kiosk voting:

The voting platforms would still be under the control of election officials, and the physical environment could be modified as needed and monitored (e.g., by election officials, volunteers, or even cameras) to address security and privacy concerns, and prevent coercion or other forms of intervention. Voting machines would be located away from traditional polling places, in such convenient locations as malls, libraries, or schools.

Remote Internet voting:

It seeks to maximize the convenience and access of the voters by enabling them to cast ballots from virtually any location that is Internet accessible. While this concept is attractive and offers significant benefits, it also poses substantial security risks and other concerns relative to civic culture.

III. Existing Voting System

In the existing voting system, the complete election process is divided constituency wise to facilitate the security forces and to make the election system fair. To maintain discipline and security requires a huge amount of man power so, it is bit difficult to accomplish election in a single day. Allocation of polls is done by election commission in advance. Generally polling booth is setup in school and community halls. The people can come to know about the location of voting. Time and place for voting is predefined. Each polling station is opened for at least 8 hours on the Election Day [3].

Fig2. Shows first of all the voter need to reach at polling booth. The first step is the identity verification, carried out by an associated person on the duty. Then officer makes mark of inedible ink on the voter's left forefinger thereafter voter has to sign in register followed by reaching inside the voting compartment. To mark a vote, a voter has to press blue candidate button on EVM machine against the name and symbol of his/her choice. When the button is pressed, the red lamp will glow against the symbol with beep sound which indicates that vote is successfully recorded [3]. Every time this process needs to be repeated as well as arrangement of building and manpower on the location of voting is required.

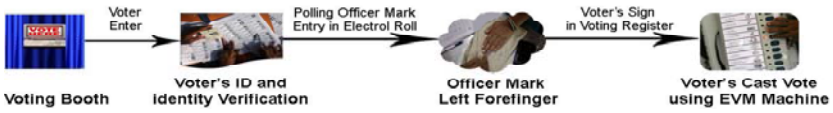

Fig. 2 Existing System

IV. Proposed Voting System Through Smart Device

As the discussion begins with voting through mobile device, first an application is required through which voters can communicate. We need to use existing database in which voters information exist. Voters/citizens information is available in register database Secure data centre is required to store and fetch the data as per requirement. Still there is a question of gathering voter's information. Fig 3 shows to begin with mobile based voting system throughout voting process an internet connection is essential. Assume that almost every next person is having mobile phone on which our application program will execute. [10]

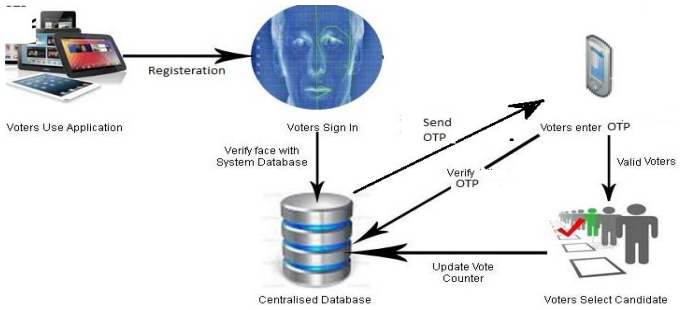

Fig. 3 Voting Process scenario

After connection is established voters need to download application from a specific source. After downloading and installing, start the application for face recognition to do this need to start front camera of smart device once it's started then need to scan face through front camera of smart device then system compares scanned image with centralized stored information this is called as sign in process. Once face is recognized successfully the complete detail of voter/citizen comes from register database and related information exists on mobile device.

Within this application list of candidates appear as per location which is fetched from register. From the list, voters can select any one candidate as per his/her choice and after selecting the candidate voting is accomplished. So, after selecting particular candidate counting is incremented by one centrally.[9] Database is used to fetch the information of voter and only one flag attribute constructed when user performs face recognition flag default value is zero changes to one which indicates that particular voter has given the vote and another separate database is used to store count of votes. So, on this location only few persons (humans) are involved to carry out this process. So, as per Indian constitution it preserves secure ballot. If Voters do not have any smart device in such situation one common location is assigned for voting through mobile phones.

V. IMAGE PROCESSING

In this system, for authentication face recognition is playing main role. Live image will be captured by mobile frontal camera. This captured image will be sent to the server for further processing. By using this image, server checks whether user is authorized or not. User is permitted for voting only if he is authorized. Fig 4 refers to block diagram of E-voting system. All registered data is stored in database. We are using server for creation and transmission of OTP. We are using android at a user side. Java programming is used as an interface to do the communication between registered data in database and android client.

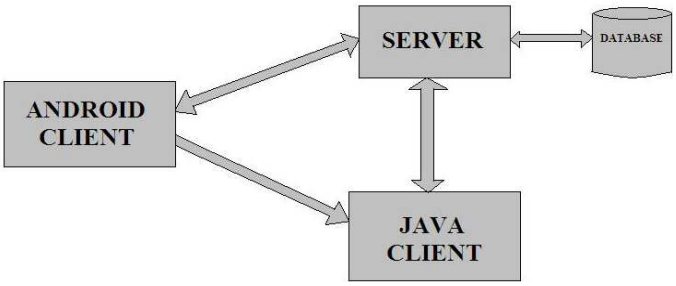

Fig. 4 E-Voting System

There are many techniques to recognize face by using image processing. We are using some standard algorithms for face recognition. And they are Grayscale, Threshold, Blurring, Scaling, Template generation & matching. These algorithms should process sequentially on image. [7] Fig 5 refers to sequence of image processing algorithm.

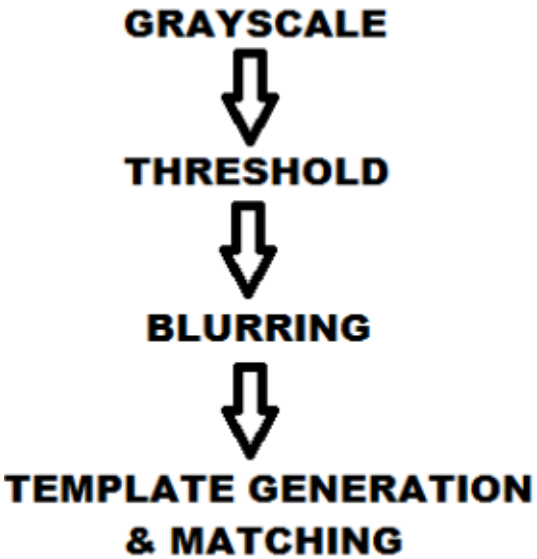

Fig. 5 Sequence of Image Processing Algorithm

a) Grayscale Algorithm

Grayscale images have many shades of gray in between. Grayscale images are also called monochromatic, denoting the absence of any chromatic variation (i.e., one color). In this system averaging method is used to grayscale the image.

In averaging method, RGB values are separated from pixel and calculate the average value by using following formula,

GS = (R+G+B) / 3.

Where GS: Average value of Red, Green and Blue.

This GS value is replaced by original pixel value. By doing this we get the image in grayscale format.

b) Threshold Algorithm

Threshold is the simplest method of image segmentation. From a grayscale image, threshold can be used to create binary images.

This convention is known as threshold above. Variants include threshold below, which is opposite of threshold above; threshold inside, where a pixel is labeled "object" if its value is between two thresholds; and threshold outside, which is the opposite of threshold inside. Typically, an object pixel is given a value of “1” while a background pixel is given a value of “0.” During the threshold process, individual pixels in an image are marked as "object" pixels if their value is greater than some threshold value (assuming an object to be brighter than the background) and as "background" pixels otherwise. Finally, a binary image is created by coloring each pixel white or black, depending on a pixel's labels.

The key parameter in the threshold process is the choice of the threshold value. Several different methods for choosing a threshold exist; users can manually choose a threshold value, or a threshold algorithm can compute a value automatically, which is known as automatic threshold. A simple method would be to choose the mean or median value, the rationale being that if the object pixels are brighter than the background, they should also be brighter than the average.

c) Blurring Algorithm

In image terms blurring means that each pixel in the source image gets spread over and mixed into surrounding pixels. Another way to look at this is that each pixel in the destination image is made up out of a mixture of surrounding pixels from the source image.

Smart Voting System with Face Recognition 35 Blurring an image reduces the sharpening effect; this makes the detection more accurate. We are doing blur by calculating the average of surrounding 8 pixels that is 3*3 windows. To increase the blur effect we can scan surrounding 5 pixels that is 5*5 windows.

d) Scaling Algorithm

Image scaling is the process of resizing a digital image. Scaling is a non-trivial process that involves a trade-off between efficiency, smoothness and sharpness. Image is scaled into some standard size by using different scaling methods.

e) Template Generation & Matching

Template matching is a technique in digital image processing for finding small parts of an image which match a template image. It can be used in manufacturing as a part of quality control, a way to navigate a mobile robot, or as a way to detect edges in images. Template matching can be subdivided between two approaches: feature-based and template-based matching.

The feature-based approach uses the features of the search and template image, such as edges or corners, as the primary match-measuring metrics to find the best matching location of the template in the source image. The template-based, or global, approach uses the entire template, with generally a sum-comparing metric (using SAD, SSD, cross-correlation, etc.) that determines the best location by testing all or a sample of the viable test locations within the search image that the template image may match up to. [12]

Improvements can be made to the matching method by using more than one template; these other templates can have different scales and rotations. It is also possible to improve the accuracy of the matching method by hybridizing the feature-based and template-based approaches. Naturally, this requires that the search and template images have features that are apparent enough to support feature matching.

VI. Content Based Temporal Sampling

The content-based temporal sampling is motivated by the following observation. When the frame rate is high enough and the change of view caused by the motion of moving camera is relatively small, the successive captured images are almost identical. Hence, transmitting visual frames with temporally similar image content over a bandwidth-limited network is not efficient for bandwidth utilization. One way to tackle the issue is to transmit frames with the most important information about the monitoring area. That is, selecting one frame from a certain sequential frames, says. The selection could be based on the image content obtained from the voting-based motion estimation and compensation process. When moving objects appear in the captured frames, a smaller value of might have a smoother video performance but lower visual quality under the requirement of the motion continuity of moving objects. On the other hand, a larger value of might sacrifice the continuity of video performance for better video quality. [8]

Most blurred frames might only have a small amount of edges. Hence, the frame with the largest number of edges among the successive frames is considered as the clearest one Fig. 6. Example of temporal sampling: and the one with the most important information about the monitoring area. The frame selection can be done as follows. First of all, the standard canny edge detection is performed to identify the location of the edge pixels. Then, count the number of pixels of changing edges on each frame and choose the largest number from sequential frames. Fig. 6 shows two scenarios of content-based temporal sampling process: one with N=3 for the existence of moving objects and the other with N=5 without any moving object. According to the content-based temporal sampling algorithm, the most important information would be preserved carefully and the redundant or similar frames would be effectively removed.

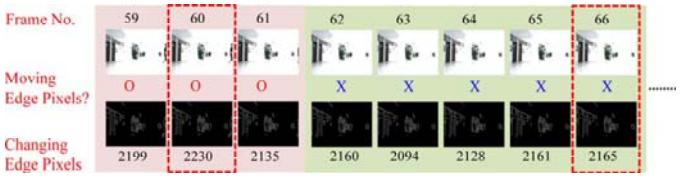

Fig. 6 Example of temporal sampling: N1=3, N2=5

VII. Server Generated OTP

Server-generated one-time passwords (OTPs) commonly are implemented as randomized password strings that are generated in real time after verifying simple-password credentials. Some more advanced implementations combine KBA elements to facilitate derived OTPs (such as server-generated grid cards for shared pattern recognition, digitally signed OTPs that are based on server-generated data, and so on). The generated OTPs then are delivered to users via a different channel (out-of-band) from the session in the browser, such as e-mail, SMS (Short Message Service) text messaging to mobile devices, direct phone calls that use computer-generated speech, and so on. Users then can use the OTP to sign-in to the application, by entering it into a designated field on the page.

Many organizations in the public sector have started to deploy this type of solution to implement strong user authentication. This approach significantly improves authentication strength as it employs two-factor authentication and out-of-band delivery of OTPs. However, it still is not completely secure, as it is prone to the "man-in-the-middle" real-time phishing attacks that try to capture and use the OTP in real time. Plus OTP delivery latencies potentially could affect overall user experience

VIII. EIGENFACE ALGORITHM

a) *Eigenface Method*

The 2D image is converted into image vector as shown in Fig 7. Eigenface applies the Karhunen Loeve expansion to extract feature within draft increasing efficiency. It can be decreasing feature dimension and handle possibility high discrimination. Karhunen Loeve is formed by Eigen vector of covariance matrix from face vector. In face space high dimension, there is some initial Eigen value which have high value. In other hand, energy most partly is located on subspace based on some initial eigenvector. Because of that, high compression can reached by permit eigenvector with high Eigen value to representative face vector because eigenvector that connected to some initial Eigen value looks like as face image. Eigenface presentation is known inside statistic literature as analysis main component. This method will efficient: for M < N, Karhunen Loeve representations have minimum mean square failure between possible probability using orthonormal M, shown in Fig 8.

Vector base orthonormal is used to form feature space, image space can describe as a vector. Image by width W and height h will forms vector that have component by size w*h. This vector arranged by accumulating row image that arranged contiguous with others.

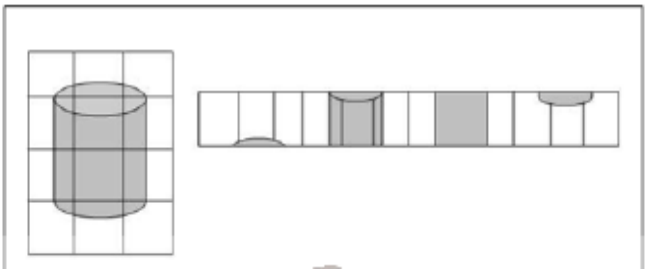

Fig. 7 Formation Image vector from 2 D image

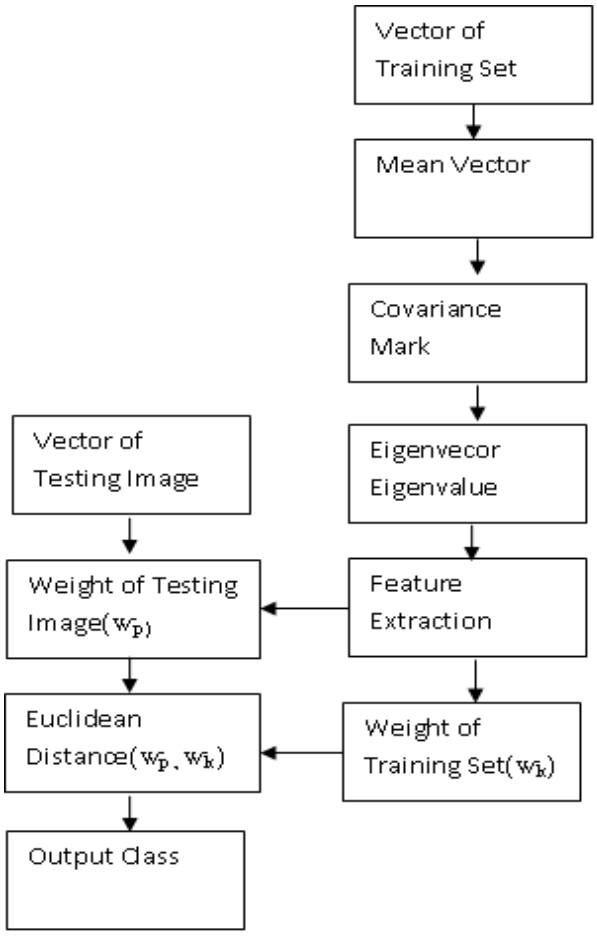

Fig. 8 Process Face Recognition base with Eigenface Method

b) Face Division

The face Image is divided into 6 facial region that is forehead, eye, nose, mouth, left side and right side regions. The Fig 9 is face division illustration. First, face image is divided vertically into two regions that is top face, this region must have forehead and eye region. Bottom face region must have nose and mouth region. Top of face is divided again into two regions where possibility forehead existed on top and eye existed on bottom. Bottom face is divided into two region where 1/3 part is possibility nose existed and 2/3 part possibility mouth existed. Right and left face to be obtained by divide face image horizontally into two parts. This step is conducted to face have difference of Pose. [3]

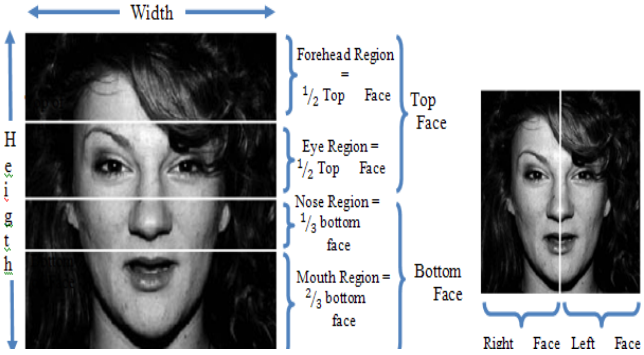

Fig. 9 Face division illustration

IX. CONCLUSION

Electronic voting systems have many advantages over the traditional way of voting. Some of these advantages are lesser cost, faster tabulation of results, improved accessibility, greater accuracy, and lower risk of human and mechanical errors. It is very difficult to design ideal e-voting system which can allow security and privacy on the high level with no compromise. Future enhancements focused to design a system which can be easy to use and will provide security and privacy of votes on acceptable level by concentrating the authentication and processing section.

In online e-voting some authentication facial reorganization, is done using eigenface algorithm. In this algorithm current image of face is compared with stream of images which are stored during registration.

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