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Iris recognition based voting system

Ms. J Nithya[1], G.Abinaya[2], B.Sankareswari[2], M.Saravana Lakshmi[2]
1. Asst.Prof, Jeppiaar Engineering College, Chennai-119
2. UG Scholar, Jeppiaar Engineering College, Chennai-119
***Corresponding author: E.Mail:Jnithya6@gmail.com**

ABSTRACT

In this voting system, the voter identity card is replaced by smart card in which all the detail of the person is updated. Only the specified person can poll using their smart card. Here the smart card reader reads the smart card and the details of that person is displayed, and then it asks for verification which is iris recognition. If the iris pattern matches then the person can poll. The person is allowed to poll once using this smart card. Once we voted, if we use smart card again, the smart card reader will access the cards but it will give a beep sound which indicates that the person has already voted.

Keywords: Iris recognition, Election System, Voting System.

INTRODUCTION

The election system is the pillar of the every democracy. The democratic administration is totally dependent on the results of the election. The election process provides the right to every citizen of a country to select a legitimate representative among themselves who can guide the democratic system towards the welfare of the society. The voting system has observed many effective changes over the past few decades, right from the traditional paper ballot voting to electronic voting and now towards the online voting. The voting system is improving step by step; advancement in the new system eliminates the drawbacks of the previous system. Every system tries to overcome the loop holes of the previous system. The primary goal of this paper is to understand the traditional voting system with the recently proposed voting systems.

Related works

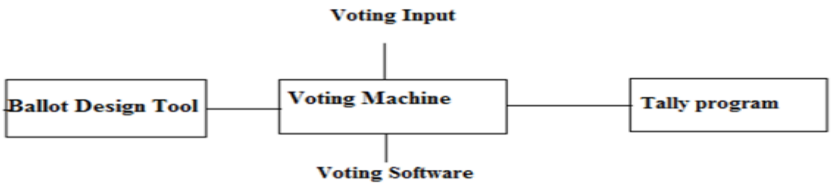


Fig.1.General Block Diagram

Paper ballot voting system: Paper ball**o**t system is a commonly used as traditional voting system (D.Chaum, 2004). Paper ballot system includes casting the vote using the paper and the stamp.

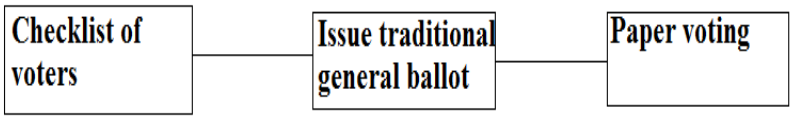


Fig.2.Block Diagram of paper voting system

Advantages of Paper Ballot Voting System: The paper ballot system gives a simplest way to cast vote. Illiterate people can also cast their vote easily. No need to guide the individual.

Disadvantages of Paper Ballot Voting System: This system is very much time consuming and slow.

Electronic voting system: An electronic voting system is a type of voting system which uses electronic ballot that would allow voters to broadcast their secret vote ballot to election officials over the internet (Robert Krimmeret et. al., 2008). With the prosperity of internet over the years, inventors start to make the use of electronic voting in order to make the voting process more convenient and to raise the participation of the civic (Tadayoshi Kohno et. al., 2004). From now on, engineers have repeatedly created new technology to improve the feasibility of electronic voting (Armen, C et. al., 2005).

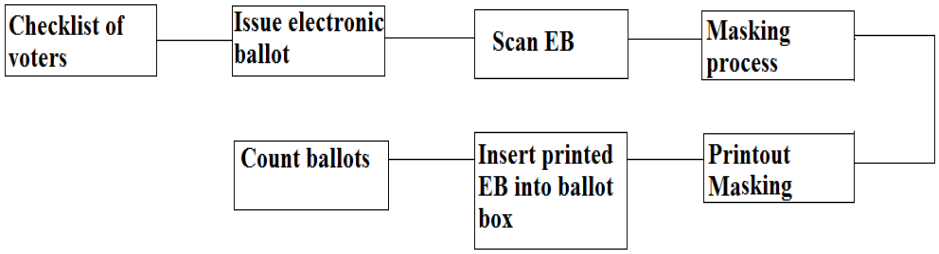


Fig.3.Block Diagram of electronic voting system

Advantages of Electronic Voting System: Once the voting time is over, the system can immediately calculate the result of the election. It is faster than the traditional ballot counting method used in traditional voting system.

Disadvantages of Electronic Voting System: The security issue is the main concern of the electronic voting system

GSM based voting machine: There are two modes of voting in this type of voting system. One is normal mode and another one is security mode. In normal mode, the person in the local area is only allowed to vote. In security based, the person in the all over the world is allowed to vote.

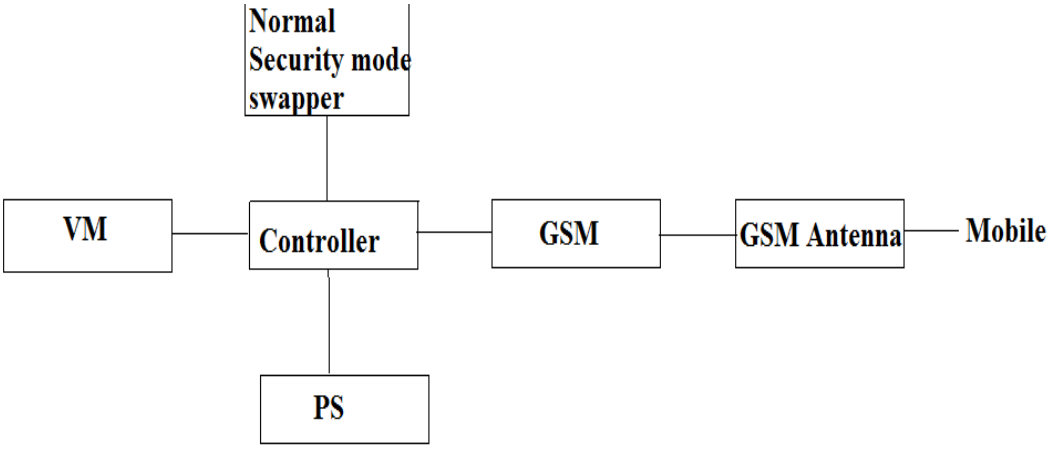


Fig.4.Block Diagram of GSM based voting system

Online voting system: Online Voting System (Craig James British Columbia, 2003) is the latest electronic voting system introduced. In which the voted ballot is transmitted over the public internet through web browser (Armen, C. et. al., 2005). The voter can directly vote online from anywhere in the world. Security is the major issue in the Online Voting System. It is very efficient and portable.

Advantages of Online Voting System: It is very much portable system as the system works on internet only the internet supporting device is required. It is very fast as compare to traditional paper ballot voting system.

Disadvantages of Online Voting System: The designing phase of this system is highly complex. The whole system operates over the internet which makes the system more susceptible to online threats so the security issue is the main concern of this system. This system is very much costlier than other systems.

Finger print voting system: In this Electronic voting Machine is designed by using finger print identification method. Here voter thumb impressions are used for identifying the voters. During voting when voter keeps his/her thumb

impression in the scanner, the system will check whether it matches with pre stored impression in the database. If it matches then system will allow the voter to poll his vote and otherwise prevent the voter from polling.

Advantage: Providing the preventive measures system for voting. It completely rules out the chance of invalid votes. It use results in reduction of polling time. Provide easy and accurate counting without any mischief at the counting center.

Disadvantage: One can easily change the thumb impression of other. The personal detail of the voter doesn't verifying in this system other than finger print.

Proposed system

Block diagram &transmitter section

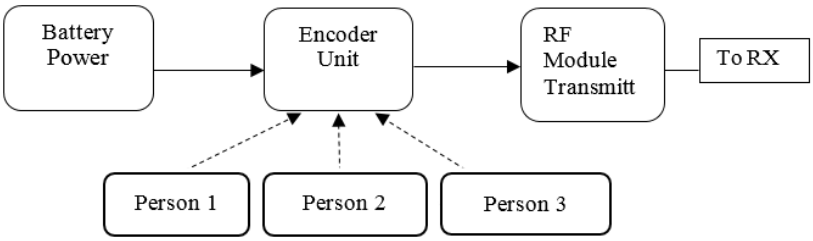
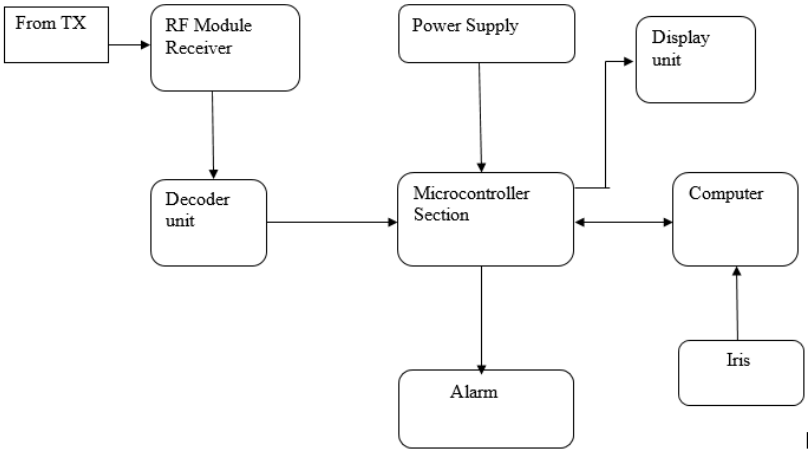


Fig.5.Block diagram of Transmitter Section



Fi.6.Block diagram of Receiver Section

The iris image of each person is the input to PC. In PC the iris image is compared with existing image. If the image is matched, the computer sends the command the person is valid to the micro controller and displayed. If it not matched, it gives an alarm and display an error message. If anyone tries to poll their vote beyond the time limit, system will be blocked.

Iris recognition: Iris recognition is a method of biometric authentication that uses pattern recognition techniques based on high resolution images of the irises of an individual's eye. An automatic segmentation algorithm based on the circular Hough transform is employed by (*C. Tisse* et. al., 2002).

Iris features extraction: Texture is that innate property of all surfaces that describes visual patterns, each having properties of homogeneity. It contains important information about the structural arrangement of the surface, such as; clouds, leaves, bricks, fabric, etc. It also describes the relationship of the surface to the surrounding environment. In short, it is a feature that describes the distinctive physical composition of a surface (*Dolly Choudhary* et. al., 2012).

Texture properties include:

- Coarseness
- Contrast
- Directionality
- Line-likeness
- Regularity
- Roughness

Texture is one of the most important defining features of an image. It is characterized by the spatial distribution of gray levels in a neighborhood (*W. Kong* et. al., 2001). In order to capture the spatial dependence of gray-level values, which contribute to the perception of texture, a two-dimensional dependence texture analysis matrix is taken into consideration.

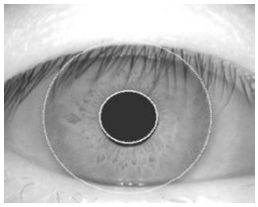


Fig.7.Iris Segmentation

Fig.8.Normalization

This two-dimensional matrix is obtained by decoding the image file; jpeg, bmp, etc

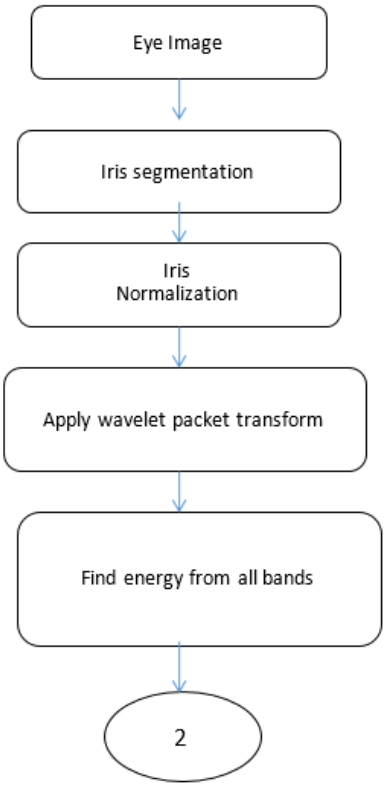


Fig.9.Iris Extraction

Euclidean distance: Euclidean distance measures the similarity between two different feature vectors using,

$$ED = \sqrt{\sum_{j=0}^{i} \left(FV_{1,j} - FV_{2,j}\right)^2}$$

Where J is the length of the feature vector, Fv is the feature vector for individual I. Each of the feature vectors is matched using Euclidean Distance with the remaining 999 feature vectors in the database. At recognition stage, features from input images are combined to form a common feature vector. Before matching process, the same features are extracted from available iris. The first level of recognition is to match the input features with database image features to identify the authorized person.

Basic steps in iris recognition:

Step I: Image acquisition deals with capturing sequence of iris images from the subject using cameras and sensors. These images should clearly show the entire eye especially iris and pupil part, and then some preprocessing operation may be applied to enhance the quality of image e.g. histogram equalization, filtering noise removal etc.

STEP II: The next step of iris recognition is to isolate the iris portion from the eye image, called segmentation. It is a technique required to isolate and exclude the artifacts as well as locating the circular iris region. The inner and the outer boundaries of the iris are calculated. Segmentation of iris depends on the quality of the eye.

STEP III: In third step segmented iris is normalized. The normalization process will produce iris regions, which have the same constant dimensions, so that two images of the same iris under different conditions will have characteristic features at the same spatial location. In order to provide accurate recognition of individuals, the most discriminating information present in an iris pattern must be extracted in the fourth step. Only the significant features of the iris must be encoded so that comparisons between templates can be made.

Once the features of iris are extracted we are required to match the iris template with the available in the database. The Hamming distance algorithm employed also incorporates noise masking, so that only significant bits are used in calculating the Hamming distance between two iris templates (Dolly Choudhary et. al., 2012).

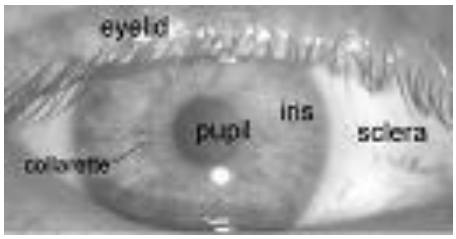


Fig.10.Human eye

Matching process will be performed using Euclidean distance and search desired minimum value for identification. Iris is fused then compared with database image feature vectors and its recognized using Euclidean or Hamming distance. If this module is completed successfully then person information which contains person authentication will be matched with extracted data from already hidden image for security

RESULT

The iris of the eye has been described as the ideal part of the human body for biometric identification for several reasons: It is an internal organ that is well protected against damage and wear by a highly transparent and the cornea. The iris is mostly flat, and its geometric configuration is only controlled by two complementary muscles that control the diameter of the pupil.

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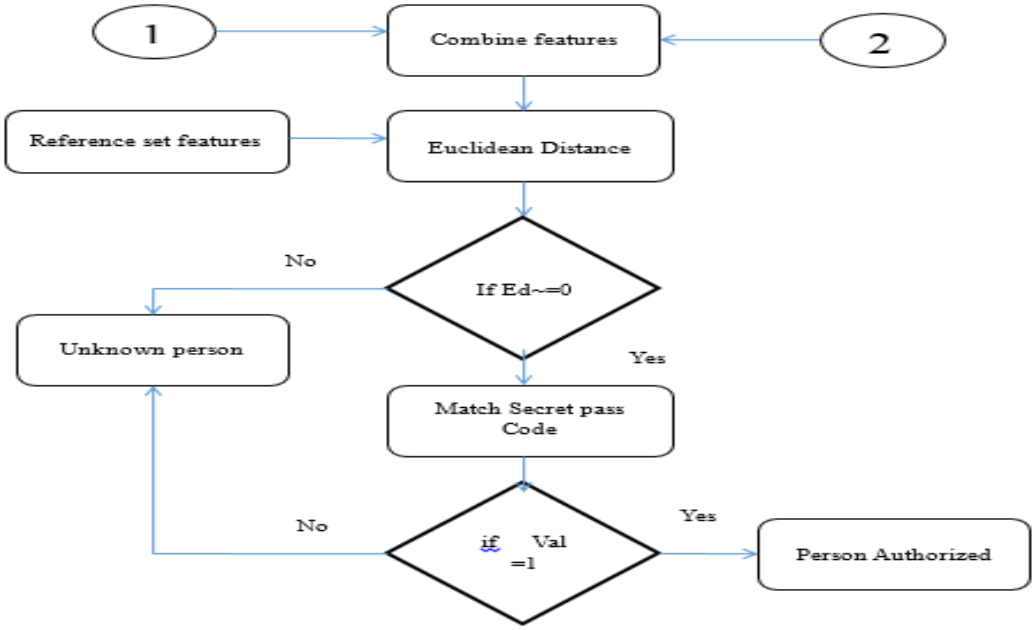

Fig.11.Matching Feature

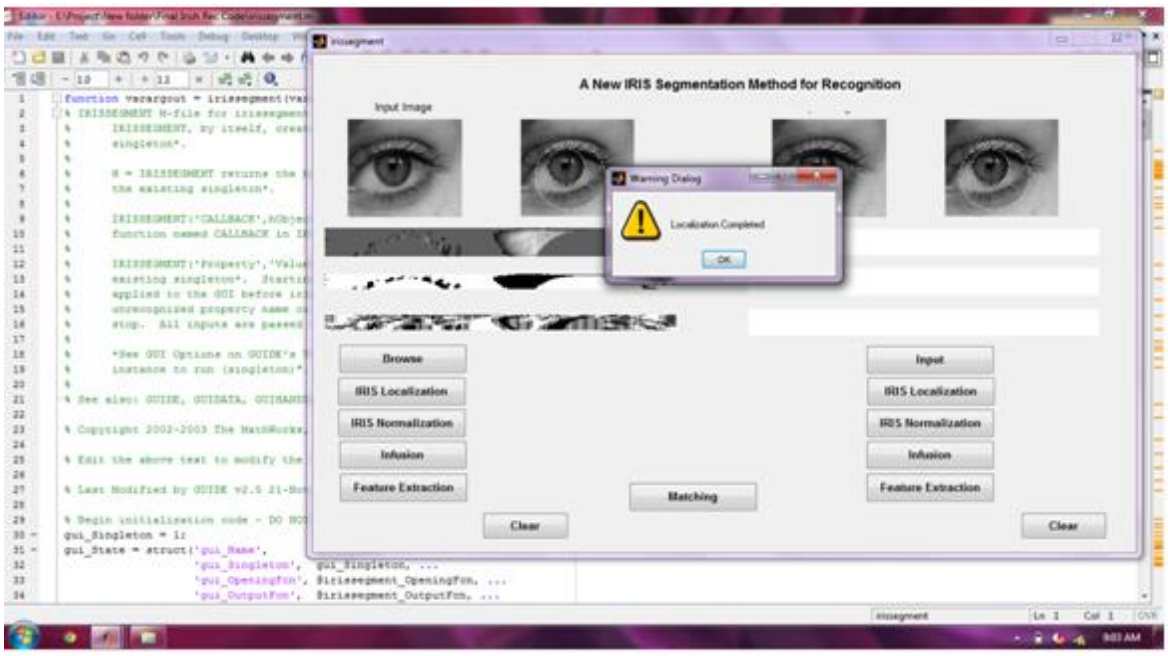

Fig.12.Iris verification process

The normalized iris image is used to detect corners using covariance matrix. The detected corners between the database and query image are used to find cross correlation coefficient. If the number of correlation coefficients between the detected corners of the two images is greater than a threshold value then the candidate is accepted by the system

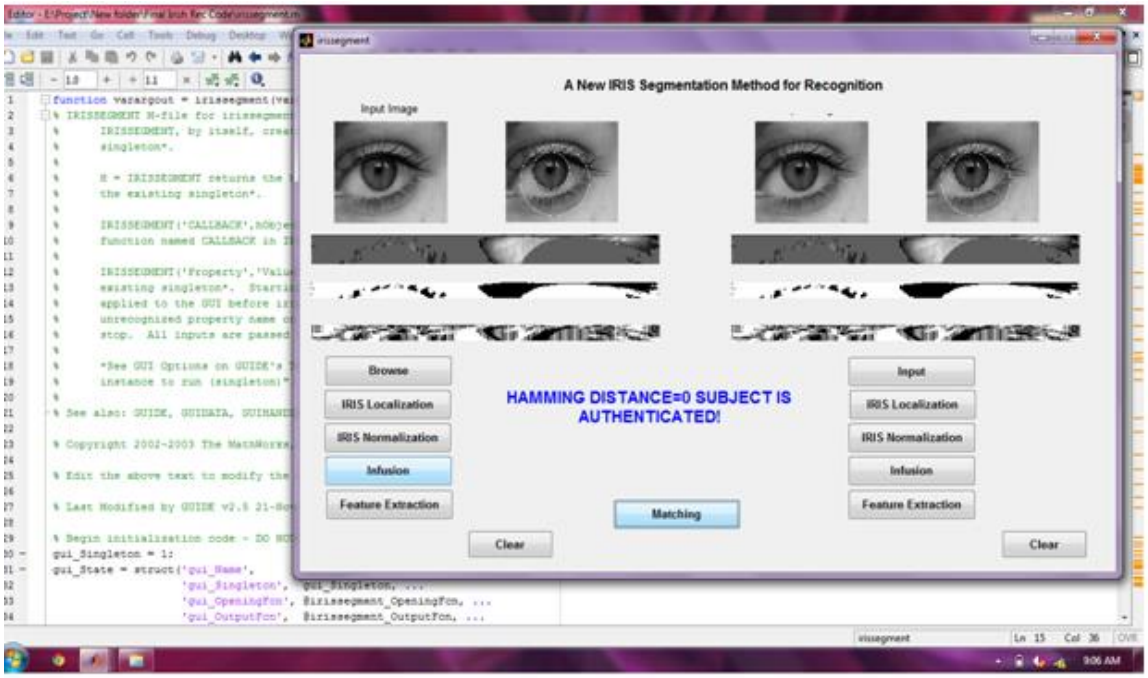

Fig.13.Authentication

The iris image of each person is the input to PC. In PC the iris image is compared with existing image. If the image is matched, the computer sends the command the person is valid to the micro controller and displayed. If anyone tries to poll their vote beyond the time limit, system will be blocked. The iris pattern of the person is matched with the existing image which is calculated by the hamming distance if the hamming distance is equal to zero then the person is authorized to cast their vote, this was shown in the display as the person was authenticated.

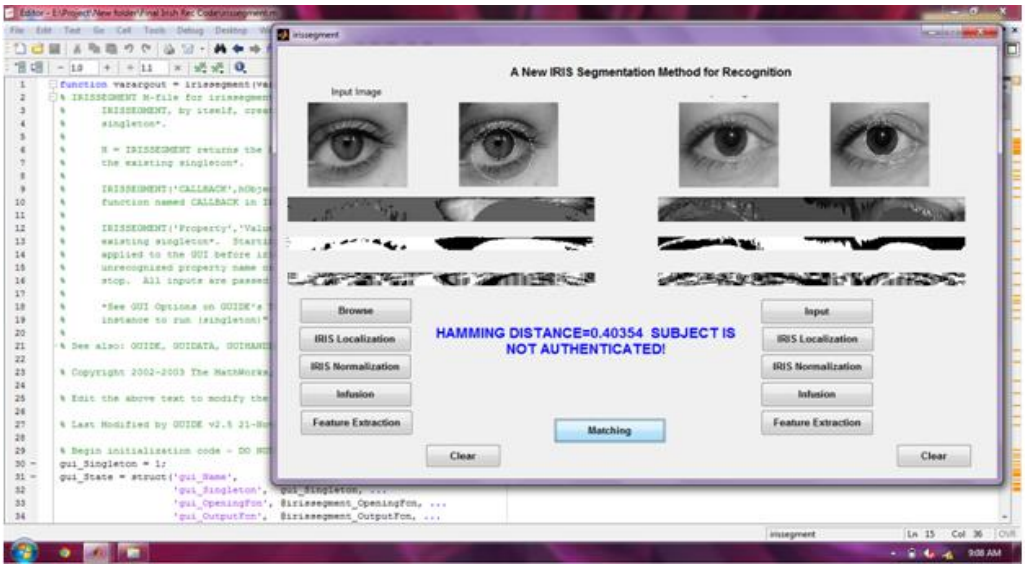

Fig.14.Unathentication

If the person iris pattern is not matched with the existing image, the hamming distance window is not equal to zero then the person is unauthorized to cast their vote, so the person is not authenticated.

DISCUSSIONS

The iris is unique. However, there are so many factors that go into the formation of these textures (the iris) that the chance of false matches for either is extremely low. Even genetically identical individuals the same have completely independent iris textures. There is no need for the person being identified to touch any equipment that has recently been touched by a stranger, thereby eliminating an objection that has been raised in some cultures against fingerprint scanners, where a finger has to touch a surface, or retinal scanning, where the eye must be brought very close to an eyepiece (like looking into a microscope).

CONCLUSION

By application of this project into real time we can avoid malfunctions, Time maintenance system, Automatic counting of votes. It is also insensitive to variations in the lighting conditions and noise levels. It specifically uses the zero crossings of the wavelet transform of the unique features obtained from the grey-level profiles of the iris. It uses only a few selected intermediate resolution levels for matching, thus making it computationally efficient and less sensitive to noise and quantization errors. Iris detection in the application works to a very high degree of accuracy in every seen case. The pupil has a fairly unique shade in comparison to the rest of the eye and its surrounding area; this enables an intelligent threshold to be carried out with information from the image histogram to isolate the pupil. This, unfortunately, is not a property shared by the iris, making it significantly more difficult to isolate than the pupil. Day by day the population is increasing enormously which in turns demands the improvement in the voting system. The primary goal of every voting system is to increase the participation of the civic. Undoubtedly the above discussed voting techniques are exceptionally good, but there is always scope for further improvement.

Advantage

Using this smart card, it is possible to poll from any polling booth rather than the particular polling booth. The iris pattern of the person is unique. It use results in reduction of polling time. It completely rules out the chance of invalid vote.

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