



HIGH LEVEL SECURITY SYSTEM USING FINGER VEIN SCANNER AND AADHAR CARD RECOGNITION FOR VOTING PROCESS

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ABSTRACT— In India, voting procedure strictly adheres to the principle of Electronic Voting Machines (EVMS) known as offline E-Voting. EVMS have the flexible characteristics like simple design, ease of use, reliability and fast accessing. Unfortunately these EVMS are criticized for the irregularity reports in elections. So these criticisms lead to damaging the main objective of the voters and Election commission also faces arduous task to conduct free and fair elections. To decrease these criticisms many of the researches are into the survey to find out the legitimate voter. Due to lack of photo clarity in the identity cards or any other reasons like Hardware problems in EVMS, malfunctioning officers invalid votes are being casted. This is about the conceptual solution through multimodal biometrics which helps in enhancing the security, eradicating the fraud and provides the high level authentication by linking with the Aadhaar card database. As the automation in biometric authentication is increasing there is demand for the high security for protecting private information and access control with increased speed and accuracy. One of the very important solutions for the security issues is the human behavioral and physiological features in biometrics. However, the existing biometric systems are not suitable in very high security and are highly complex in terms of time or space or both. Thus a biometric authentication based on finger-vein recognition system is proposed. The proposed system is implemented using maximum curvature points algorithm. The analysis is done using the various parameters from matching points. The analysis shows that the finger vein recognition is easier and reliable. High accuracy will be achieved by finger vein recognition systems compared to present EVM system.

Keywords— EVM, Finger vein, Aadhar card, Voting system.

1 INTRODUCTION

Biometric based personal identification technology ,e.g. finger print which receives more and more attention, as the security issue about personal information becomes increasingly important and relevant identification device more affordable. Although very stable and accurate in recognition biometric authentication technology will confront a common problem (fraud and malpractices).we need an effective way to reduce risk caused by fake biometric as much as possible. For that we implement finger vein authentication. finger vein which grow in a subcutaneous layer of the finger body and naturally immune to fraud and theft. These patterns of finger vein which unique to individual person.

In India voting process is in documentary level, which adheres to the principle of Electronic Voting Machines (EVMS) known as offline E-Voting. EVMS have the flexible characteristics like simple design, ease of use, reliability and fast accessing. Our voting system is based on document orientation for checking and indentifying the individuals for an eligibility to vote(e.g voter Id, ration Id) and it also requires some sort of security to monitor the voting system. After checking personal identification, the person has the ability to vote, before entering into the EVM machine to poll our vote for parties, the authority who undergo supervision in voting system will mark our finger nail with indelible ink and then we poll our vote in EVM machine. The above voting system undergo malpractices in voting process and it is still lagging in security like(marking in finger nail, documentary) which is easily corrupted by some illegal persons. For improvement in our voting process we gone for biometrics. To get more security, we had idea on biometric finger print authentication. Fingerprint processing has three primary functions: enrollment, searching and verification. Among these functions, enrollment which captures fingerprint image from the sensor plays an important role. A reason is that the way people put their fingerprints on a mirror to scan can affect to the result in the searching and verifying process. Regarding to verification function, there are several techniques to match fingerprints such as correlation-based matching, minutiae-based matching, ridge feature-based matching and minutiae-based algorithm. However, the most popular algorithm was minutiae based matching algorithm due to its efficiency and accuracy. Though finger print recognition is better when compared to older system, it has some drawback in its side. somebodys can make duplicate finger print by using silicon gel or through some cosmetic surgery. So to reduce such risk and malpractices we Finally chose finger vein authentication for high level security. Finger vein authentication does the functions of image acquisition, storage, pre-processing, segmentation, representation, recognition and interpretation and finally displays or records the resulting image. Finger body is placed in front of the light illuminance and then image is captured by camera. By using maximum curvature algorithm we extracts vein patterns rectangular image piece of finger body. Then, extracted pattern is compared with our original vein pattern, finally authentication is verified. In finger vein recognition, no one make duplicate copy of that pattern. because structure of finger vein pattern is unique to each individual person.

2 Finger vein voting model

This system is used to improve the level of security in voting process and to use only the aadhar card to be the only source of identity and the finger vein system is the new method of biometric security system and it provides very high security than the current system and hacking this system is nearly impossible thus providing a highly secured and fraud less voting process.

2.1 Aadhar identity

All the details of the voter are stored in the aadhar card so there is no need for a separate voter ID.

2.2 Finger vein system

This system acts as the security for accessing the polling box.

This system consists of a high intensity LED light which helps in displaying a clear pattern and a high definition camera is also used in order to capture the vein pattern and the image is sent to get processed in the Matlab software where it gets converted to grayscale and then gets stored in the database of the voter then at the time of polling when the aadhar card is first scanned the vein pattern of the voter is extracted to the system from the voters database and then the current vein pattern obtained from the voter is then matched using the maximum curvature point algorithm the patterns are matched and then if recognized then voter is allowed to continue further or the process gets terminated.

3 SYSTEM ANALYSIS

3.1 Existing System

The present voting process in India is in documentary level, which adheres to the principle of Electronic Voting Machines (EVMS) known as offline E-Voting. EVMS have the flexible characteristics like simple design, ease of use, reliability and fast accessing. Our voting system is based on document orientation for checking and indentifying the individuals for an eligibility to vote and it also requires some sort of security to monitor the voting system. After checking personal identification, the person has the ability to vote, before entering into the EVM machine to poll our vote for parties, the authority who undergo supervision in voting system will mark our finger nail with indelible ink and then we poll our vote in EVM machine.

4 MAIN FEATURES OF FINGER VEIN VOTING SYSTEM

4.1 Simplicity:

The system is highly simple compared to the current system as this system does not require any additional labor to supervise as the system is fully automated and highly secured.

4.2 Security

It provides two level of security

- (a) To initially identify the voter using aadhar card.
- (b) To confirm the identity using finger vein system before polling the vote.

5 IMPLEMENTATION OF FINGER VEIN VOTING SYSTEM

LED Provides Proper Intensity of Light ,so the pattern of the finger vein is clearly achieved and the image is captured using camera focuses accurately and the pattern is clearly obtained. These pattern is stored and then the present captured image is compared with the average mean value of sample image, when the score is approximately equal then the pattern is matched. First the system stores the patterns of the finger veins in multiple samples then when the voter uses his aadhar card to initiate the voting process then the system opens up his details and asks the voter to confirm his identity using the finger vein scanner once the voter places his finger in the scanner the vein pattern is captured and then the system will match the patterns with the samples using the maximum curvature point

algorithm in the Matlab software and when the pattern matches it will display whether the voter is recognized or not recognized. If the voter gets recognized then the counter with a buzzer sound starts with a timer for the voter to cast his vote if the timer ends the voter will not be allowed to vote again so the voter has to cast his vote before the timer ends. Once the vote is cast then the socket test software will receive a signal from the wifi, as the circuit is connected to a wifi transmitter and from the signal it receives to which party the vote is being cast and can be viewed from a common server and the data helps in counting all the votes instantly and even used to display the results to the public to avoid any fraud being done in counting the votes which helps the election department to reduce the time lapse in counting the votes and eradicate the frauds being done in the vote counting process. The finger vein sensor is a new technology that is being used in very few countries but the cost of these devices are costly but proposed sensor is cheap of cost with accuracy and so the system can be used in a larger scale with high cost efficiency and as the system is also cost efficient and it saves a lot of time so it is wiser to use this system in voting and even for many other purposes. The graphs explains about the process being carried out by the algorithm and the algorithm matches the point in the vein patterns and gets an average value for the samples and when tested it compares the current value with the samples and when the two values matches in a certain range then the sensor gives the output to be recognized and when the values doesnt match then the output will be not recognized and as the sensor is linked with the circuit it check for the eligibility of the voter and either allows him if his identity is confirmed and blocks his request for voting if his identity is not confirmed. In a prior due if the aadhar card was already used for voting then the process is terminated and the voter is not allowed to proceed further. Thus the output of the project explains the accuracy and that it is fraud proof as a new level of security system is used.

6 CONCLUSION AND FUTUREWORK

The above Proposed system is highly efficient and secure ,thus the frauds involved in election can be eradicated completely, the total system is cheaper compared to all the systems that is being used currently. The system can be used in various other applications other than the voting process this new biometric security system can do a revolution in the technology world as it can be used to change the current system of using the finger print biometric system which can be hacked with no much difficulty so this system can be used to replace those less secure system with this highly secured system and further on this system can be used in all the purposes that the current biometric system of finger print can be used.

On a further hand we are also planning to do a miniature size of our model which can be used in mobiles and in personal computer for security purpose just by using the cameras in mobile phones and webcams in PCs by using an attachable high powered LED lights or even a IR light which can be attached and removed at will. This can also be used in cars and other locomotives for door security and even to start engines without the use of key and even in houses to be used in doors and in private lockers and various other security purposes in future as this is one of the biometric which has a really low chances of hacking as getting the finger vein pattern of a person without the proper sensor is impossible.

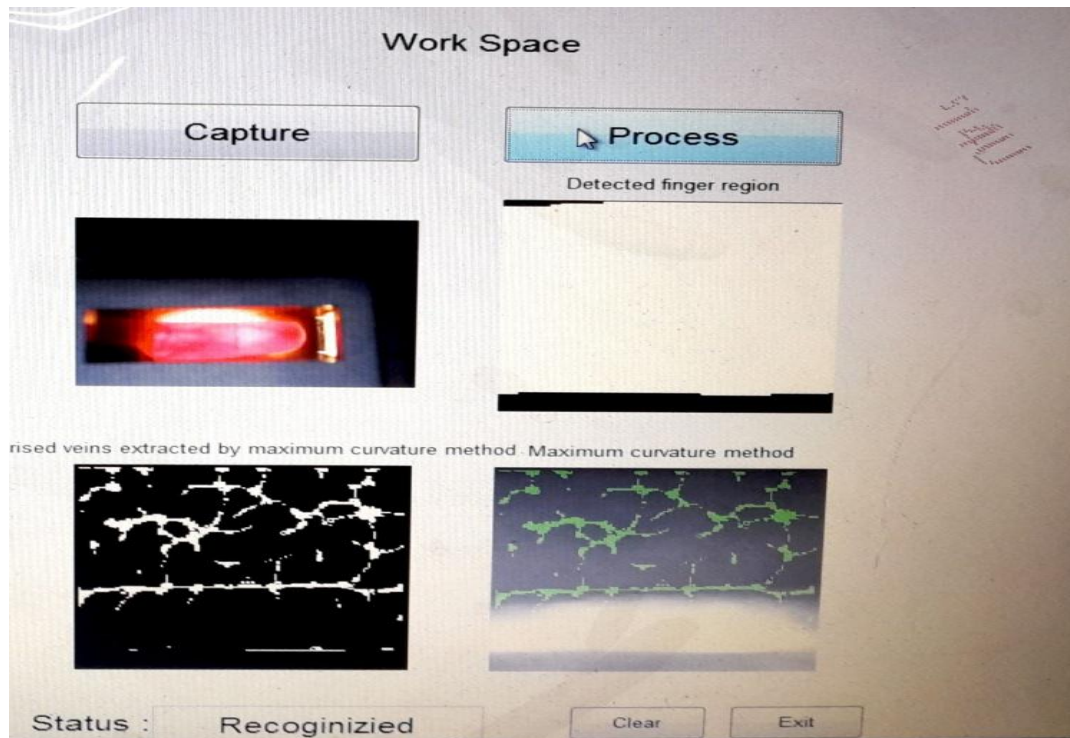


Figure.1 Final output with finger vein matching

REFERENCES

- 1.A Finger Vein Image Based Personal Identification System With Self Adaptive Illuminance Control
Liukui chen, jing Wang, student member,IEEE, hiyu yang and Haibo He, senior member,IEEE.
2. End-to-End Encryption Based Biometric SaaS: Using Raspberry Pi as a Remote Authentication Node
Dhvani K. Shah; Vinayak A. Bharadi; V. J. Kaul; Sameer Amrutia 2015 International Conference on Computing Communication Control and Automation. Year: 2015 ,Pages: 52 - 59, DOI: 10.1109/ICCUBEA.2015.19



3. An efficient biometric based personal authentication system using Finger Knuckle Prints features

Mourad Chaa; Naceur-Eddine Boukezzoula; Abdallah Meraoumia; Maarouf Korichi ,2016 International Conference on Information Technology for Organizations Development (IT4OD) .Year: 2016 ,Pages: 1 - 5, DOI: 10.1109/IT4OD.2016.7479314

4. Desisting the Fraud in Indias Voting Process through Multi Modalbiometrics

P. Vidyasree; S. Viswanadha Raju; G. Madhavi ,2016 IEEE 6th International Conference on Advanced Computing (IACC) ,Year: 2016 Pages:, 488 - 491, DOI: 10.1109/IACC.2016.97

5. A biometric authentication system based on finger vein recognition

Manisha Sapkale; S. M Rajbhoj ,2016 International Conference on Inventive Computation Technologies (ICICT) ,Year: 2016, Volume: 3 ,Pages: 1 - 4, DOI: 10.1109/INVENTIVE.2016.7830222

6. A finger vein recognition system

Manisha Sapkale; S. M. Rajbhoj ,2016 Conference on Advances in Signal Processing (CASP) Year: 2016 ,Pages: 306 - 310, DOI: 10.1109/CASP.2016.7746185