INTEGRATION OF EDGE DETECTION MECHANISM AND HUFFMAN TO IMPROVE PERFORMANCE OF BIOMETRIC SYSTEM

Meenakshi Rani
Computer Science & Engineering
Om institute of technology & management, Email Id: meenakshichopra6782@gmail.com
Dr.Saurabh Charaya, HOD (Computer science & Engineering)
Om Sterling University, Hisar. Email Id: saurabh.charaya@gmail.com

ABSTRACT: Need of biometric system is growing day to day. The proposed system has considered edge detection mechanism along with compression techniques in order to reduce the comparison time during biometric processing. From existing research it is concluded that there is need to introduce an efficient biometric mechanism. The proposed implementation has used Matlab to perform simulation. The canny edge detection mechanism would eliminate all unwanted contents from biometric sample. Moreover the use of Huffman compression technique would also reduce the size of edge based graphical content. Such system save the storage space and reduce the comparison time.

Keywords: Biometric, IRIS, database, image, edge

1. INTRODUCTION

Biometric system architecture is used to achieve the aim of specific pattern matching and Recognition. Biometric based systems are able to authorize human being on the base of required Biometric sample. These Biometric samples may be Palm Print, Finger Print, Iris Sample, Voice Sample according to the Biometric devices. These are single person based finger print limited areas. Biometric system architecture represents whole system. It includes functionality mapping on hardware and for software principle mapping of architecture on hardware architecture. Different set of sensors, algorithms and sub systems are present in different biometric systems. Comparing a sign up biometric system against recently captured sample of biometric is required in verification of biometric system. To confirm if under two different names someone has not applied right print the complete database could be checked. It is also known as one-to-many matching. Verification mode of a system could be in order to authenticate a person's identity from previous pattern that was enrolled. It is also known as one-to-many matching. Numbers of other issues that need to be cared are involved in feasible system of biometric.

Fig 1 BIOMETRIC

1.1 BIOMETRIC SYSTEM ARCHITECTURE

Biometric System is portrayal of a framework, including a mapping of usefulness onto equipment and programming instrument. Distinctive biometric Verification frameworks may have diverse arrangement of sensors, sub-frameworks, algorithms, to accomplish target of explicit pattern acknowledgment and coordinating. They have wrapping design of a biometric get to control framework for constrained territories based single individual unique Signature. Biometric Verification systems make comparison between an enlisted or sign up biometric sample with already existing samples in database. The time of sign up as appeared in an example of biometric attribute is captured. They prepared by a PC and put away for later correlation. This framework could be apply in confirmation mode, where biometric framework perceive a sample of human from whole sign up populace by finding a database for a match dependent on this framework. This is now and then called one-to-many coordinating. A framework could likewise be utilized in Verification Mode, where biometric framework verifies an individual's asserted character from their recently enlisted biometric sample. This is additionally called one to one coordinating.

1.2 IRIS RECOGNITION

Iris Recognition has been known as a technique in which iris sample of an individual is used to identify him separately. Muscle inside the eye is known as Iris, directs the size of the pupil. It controls the measure of light that enters the eye. It is the hued segment of the eye with shading dependent on the measure of melatonin color inside the muscle. The framework is to be made out of various sub-frameworks, which relate to each phase of iris Recognition. These stages are:

• Image procurement – In this step, an image of eye is captured.

• Segmentation – In this step, the iris district is found in an eye picture.

• Normalization – In this step, dimensionally reliable portrayal is made of the iris area.

• Feature encoding – In this step, a layout is made consisting just most separate feature related to iris.

Eye Iris Recognition is a computerized and automatic biometric technique. In this technique, the numerical pattern methods on video pictures are used. These patterns may be of either of the irises of a person's eyes. The patterns of iris are used as these are extraordinary, stable, and are visible from some separation.

Fig 2 Iris Recognition

2. OBJECTIVE

The objectives of research have been discussed below:

1. To reduce the size of Iris samples by integration of Huffman coding Mechanism

2. To eliminate useless portion of biometric samples using Canny Edge Detection Mechanism

3. To integrate Radio Frequency Identification (RFID) Technology to improve the performance of Biometric Attendance System

4. To use Matlab simulation tool for simulation of proposed work' results

5. To compare Propose Attendance System with existing system on the base of space and time consumption etc.

6. To propose a comparative analysis to determine the applicability and efficiency of proposed system

3. METHODOLOGY/TECHNOLOGY
3.1 CANNY EDGE DETECTION MECHANISM

Edge Detection is a part of Image processing utilized as a tool to detect the edge of given image. It processes the graphical content fundamentally for highlight discovery and extraction. It is supposed to confirm focuses in an advanced picture where splendor of picture changes strongly and discover error. The use of Edge Detection mechanism is essentially to diminish the size of graphical content in a picture after that further phase of picture processing starts.

4. TOOLS AND TECHNOLOGY USED IN RESEARCH WORK
4.1 MATLAB

MATLAB is a well known and most favorite tool for Technical Computing. It is an elevated level language inside intelligent or fast environment. MATLAB empowers us to perform computationally undertakings faster as contrast with other programming dialects, for example, C, C++, and FORTRAN.
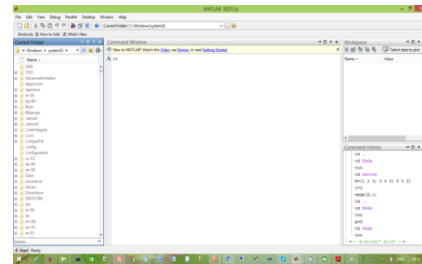

Fig 3 MATLAB Environment

5. PROPOSED MODEL

In proposed attendance system, user connects directly to web interface in order to confirm his presence just like traditional model. But the biometric iris sample passed by user is processed by Huffman and Canny Edge Detection Mechanism. Huffman technique is used to compress the iris sample in order to decrease its size and Canny Edge Detection is applied in order to get only edge of iris sample.
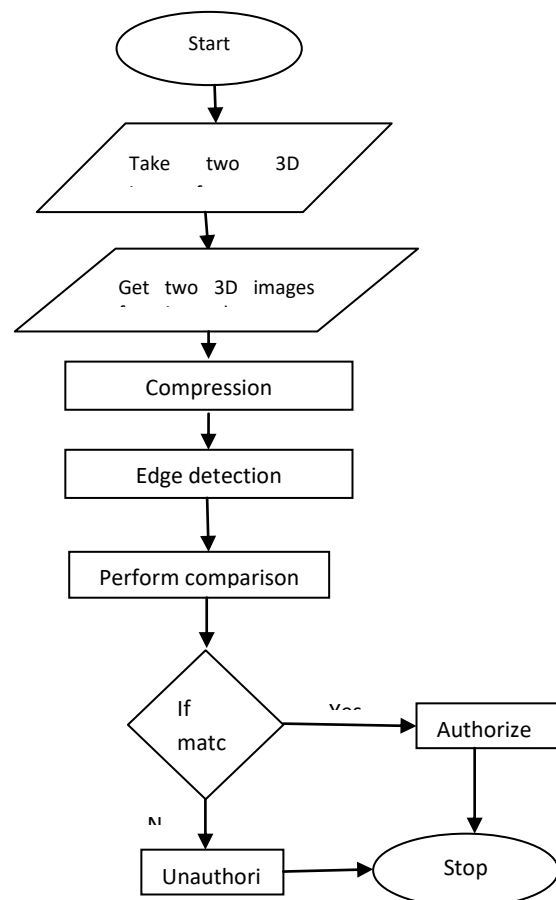

Fig 4 PROPOSED MODEL

6. RESULTS OF IMPLEMENTATION

The following figure show Comparison of file size of image1 to compared in traditional and proposed
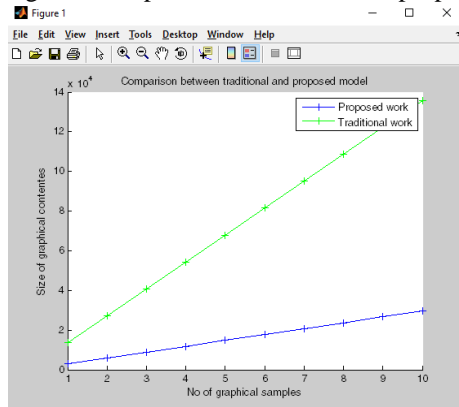
Fig 5. Comparison of file size of image1 to compared in traditional and proposed in case of match

The following figure shows Comparison of file size of image1 for comparison in traditional and proposed in case of match.
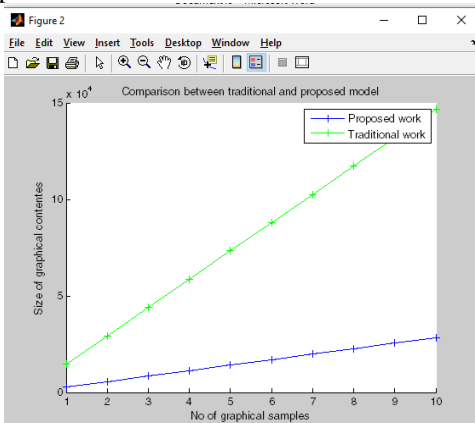
Fig 6 Comparison of file size of image1 for comparison in traditional and proposed in case of match

The following figure show Comparison of file size of image2 to compared in traditional and proposed in case of match.
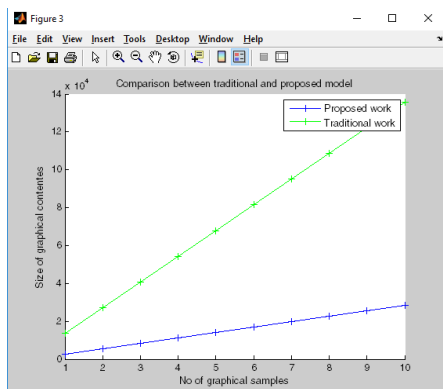
Fig 7 Comparison of file size of image2 to compared in traditional and proposed in case of match

The following figure shows Comparison of file size of image2 for comparison in traditional and proposed in case of match.
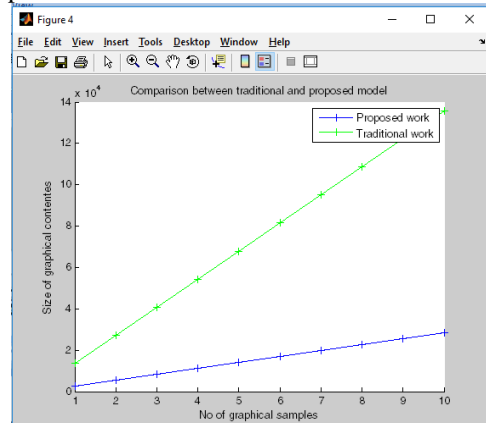
Fig 8 Comparison of file size of image2 for comparison in traditional and proposed in case of match
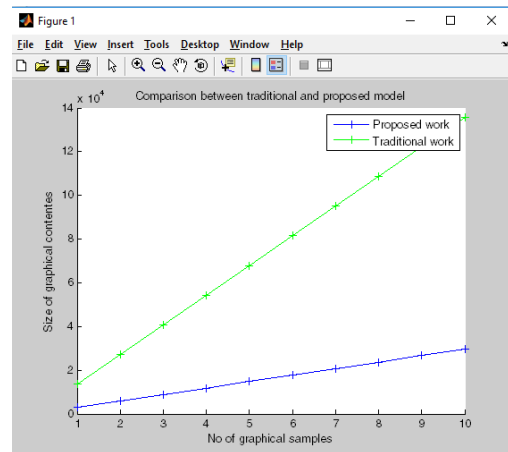
Fig 9 Comparison of file size of image1 to compared in traditional and proposed in case of mismatch

The following figure shows Comparison of file size of image1 for comparison in traditional and proposed in case of mismatch.

Fig 10 Comparison of file size of image1 for comparison in traditional and proposed in case of mismatch

The following figure show Comparison of file size of image2 to compared in traditional and proposed in case of mismatch.

Fig 11 Comparison of file size of image2 to compared in traditional and proposed in case of mismatch

The following figure shows Comparison of file size of image2 for comparison in traditional and proposed in case of mismatch.
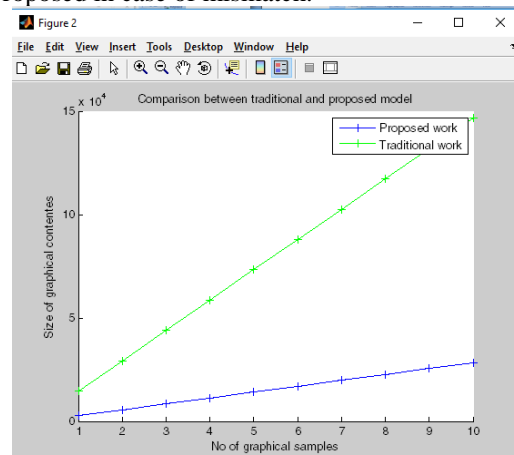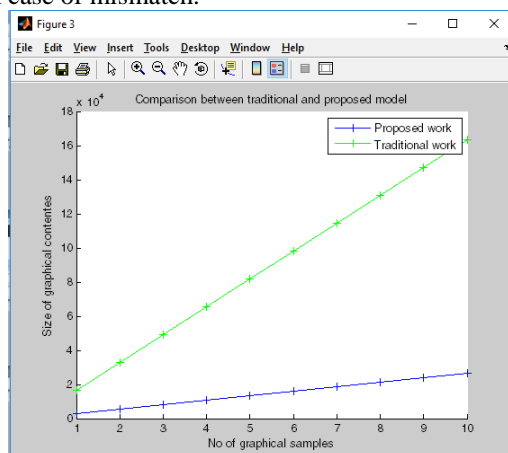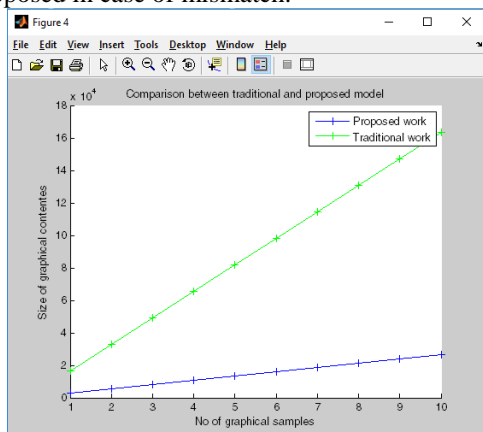

Fig 12 Comparison of file size of image2 for comparison in traditional and proposed in case of mismatch

7. CONCLUSION

In this research work, RFID based Biometric attendance system is proposed. This attendance system is connecting user to web interface to confirm his presence. In this system, for verification, iris samples are taken. The biometric sample passed by user is reduced by size using Canny Edge Detection Mechanism. As edge based image of biometric sample is taken for comparison, less space is required. This edge based biometric sample has been compared to edge based biometric sample that is stored in remote database. As a result, comparison time is also found less as edge of graphic samples are compared. If the edge based biometric sample in database matches to the edge based biometric sample passed by user then the attendance is taken and his presence is confirmed. RFID is integrated with Biometric to develop efficient web enabled attendance system. This research work is using canny based edge detection mechanism and Huffman that are able to increase the performance and reduce the time space consumption. Then comparative analysis of traditional Attendance system with proposed work is made to show the better efficiency and performance of proposed model.

8. REFERENCES

[1] L. Masek, "Recognition of Human Iris Patterns for Biometric Identification", Measurement, Vol. 32, No. 8, 2003, pp. 1502-1516.

[2]V. V. S. Tallapragada and E. G. Rajan, "Multilevel Network Security Based on Iris Biometric," 2010 International Conference on Advances in Computer Engineering, Bangalore, 2010, pp. 193-197.

[3] Majid taghiloo, "Mobile based secure digital wallet for Peer to peer payment system",International journal of ubicomp (iju), vol.1, no.4, october 2010

[4]Mandeep Kaur, Manjeet Sandhu, Neeraj Mohan and Parvinder S. Sandhu , "RFID Technology Principles, Advantages, Limitations & Its Applications" , International Journal of Computer and Electrical Engineering, Vol.3, No.1, February, 2011 1793-8163

[5]Rajesh krishna balan "Digital wallet: requirements and challenges",2011

[6]S. I. Safie, J. J. Soraghan and L. Petropoulakis, "ECG biometric authentication using Pulse Active Width (PAW)," 2011 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (BIOMS), Milan, 2011, pp. 1-6

[7]S. Aldosary and G. Howells, "A Robust Multimodal Biometric Security System Using the Polynomial Curve Technique within Shamir's Secret Sharing Algorithm," 2012 Third International Conference on Emerging Security Technologies, Lisbon, 2012, pp. 66-69.

[8]Ononiwu G. Chiagozie, Okorafor G. Nwaji "RADIO FREQUENCY IDENTIFICATION (RFID) BASED ATTENDANCE SYSTEM WITH AUTOMATIC DOOR UNIT", 2012 SAVAP International.

[9]Sumita Nainan, Romin Parekh, Tanvi Shah, "RFID Technology Based Attendance Management System"2013.

[10]P. Matthew, "Autonomous synergy with biometric security and liveness detection," 2013 Science and Information Conference, London, 2013, pp. 376-382.

[11]A. Agarwal, S. Maheshwari and G. Yadav, "Vein biometric security using irreversible curve fitting accounting for minimum storage," 2014 International Conference on Signal Propagation and Computer Technology (ICSPCT 2014), Ajmer, 2014, pp. 179-183.

[12]J. Galbally, S. Marcel and J. Fierrez, "Image Quality Assessment for Fake Biometric Detection: Application to Iris, Fingerprint, and Face Recognition," in IEEE Transactions on Image Processing, vol. 23, no. 2, pp. 710-724, Feb. 2014.

[13] J. Lee, Y. H. Kim and J. K. Lee, "SSL Application for Managed Security between the Mobile and HIS Biometric Information Collection Client," 2014 28th International Conference on Advanced Information Networking and Applications Workshops, Victoria, BC, 2014, pp. 55-60

[14] Marijo Maracic "Biometric Authentication System based on 3D Facial models" 2014.

[15] mohammad salah uddin "E-wallet system for bangladesh an electronic payment system" international journal of modeling and optimization, vol. 4, no. 3, june 2014

[16]Jianqiang Wang, Daiheng Ni, and Keqiang Li, "RFID-Based Vehicle Positioning and Its Applications in Connected Vehicles" , 2014.

[17]Enrique Valero ,Antonio Adan and Carlos Cerrada, "Evolution of RFID Applications in Construction a Literature Review ", International Conference on Ubiquitous Computing and Ambient Intelligence,2015.

[18] Damon L. Woodard, Timothy C. Faltemier, Ping Yan, Patrick J. Flynn, Kevin W. Bowyer "A Comparison of 3D Biometric Modalities" 2015

[19] Ruggero Donida Labati, Angelo Genovese, Enrique Mũnoz "Automated Border Control Systems: Biometric Challenges & Research Trends" 2015

[20]Aravind G, Andan H M, T. Singh and G. Joseph "Development of biometric security system using CBIR and EER,"International Conference on Communications and Signal Processing (ICCSP), Melmaruvathur, 2015, pp. 0884-0888.

[21]R. Tolosana, R. Vera-Rodriguez, J. Ortega-Garcia and J. Fierrez, "Increasing the robustness of biometric templates for dynamic signature biometric systems," International Carnahan Conference on Security Technology (ICCST), Taipei, 2015, pp. 229-234.

[22]R. E. O. Paderes, "A Comparative Review of Biometric Security Systems," 8th International Conference on Bio-Science and Bio-Technology (BSBT), Jeju, 2015, pp. 8-11.

[23]V. Vaka, D. Lindskog and P. Zavarsky, "Enhancing of biometric authentication with pass strings and cryptographic checksums,"4th International Symposium on Digital Forensic and Security (ISDFS), Little Rock, AR, 2016, pp. 170-170.

[24]Dr. Vinit Kotak, Ms. Archana Chaugule, Aakanksha Utkhede, Tushar Chemburkar, Saurabh Tendulkar, "RFID-based Bus ticketingsystem ", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 2016.

[25]V. Yadav, M. Verma and V. Dixit Kaushik, "A biometric approach to secure big data," International Conference on Innovation and Challenges in Cyber Security (ICICCS-INBUSH), Noida, 2016, pp. 75-79.

[26] Eligijus Sakalauskas , Jonas Muleravicius , Inga Timofejeva "Computational resources for mobile E-wallet system with observers," pp. 89–93, 2017.

[27] F. Zhu et al., "Trust Your Wallet : a New Online Wallet Architecture for Bitcoin," 2017.

[28] O. S. Okpara, "Cam-Wallet : Fingerprint-Based Authentication in M-Wallets using Embedded Cameras," 2017.

[29]R. J. Prarthana, A. M. Dhanzil, N. I. Mahesh and S. Raghul, "An Automated Garage Door and Security Management System (A dual control system with VPN IoT & Biometric Database)," 2018 Second International Conference on Electronics, Communication and Aerospace Technology (ICECA), Coimbatore, 2018, pp. 1468-1472

[30] J. J. Howard, A. J. Blanchard, Y. B. Sirotin, J. A. Hasselgren and A. R. Vemury, "An Investigation of High-Throughput Biometric Systems: Results of the 2018 Department of Homeland Security Biometric Technology Rally," 2018 IEEE 9th International Conference on Biometrics Theory, Applications and Systems (BTAS), Redondo Beach, CA, USA, 2018, pp. 1-7.

[31] K. Singh, "An Interoperable & Secure E-Wallet Architecture based on Digital Ledger Technology using Blockchain," 2018 Int. Conf. Comput. Power Commun. Technol., pp. 165–169, 2018.

[32] K. Prlhodova and M. Hub, "Biometric Privacy through Hand Geometry- A Survey," 2019 International Conference on Information and Digital Technologies (IDT), Zilina, Slovakia, 2019, pp. 395-401.

[33] K. Singh, A. K. Sajnani and S. Kumar Khatri, "Data Security Enhancement in Cloud Computing Using Multimodel Biometric System," 2019 3rd International conference on Electronics, Communication and Aerospace Technology (ICECA), Coimbatore, India, 2019, pp. 175-179.

[34] A. Kathed et al., "An Enhanced 3-Tier Multimodal Biometric Authentication," 2019 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, Tamil Nadu, India, 2019, pp. 1-6.