AN EFFICIENT EAR RECOGNITION SYSTEM USING E-PASSPORT

R.Shankari[1], Shayana.T.C[2], Suba Iswarya.V[2], Sujatha.S[2], Vinnarasi.P[2]

Assistant professor[1], UG Student[2], Dept. of ECE, Velammal Engineering College ,Chennai.

ABSTRACT: Many modern applications such as voting systems are not able to meet strict security performance by using conventional personal authentication such as password or ID card. The applications generally make use of computer networks (e.g., Internet), affect a large portion of population, and control financially valuable and privacy-related tasks (e.g., e-commerce). A good alternative to conventional method are biometrics based authentication system which use physiological and/or behavioral traits (e.g.: fingerprint, face and signature). In spite of these advantages these systems are more reliable (biometric data cannot be lost, forgotten, or guessed) and of biometric systems over traditional systems, there are many unresolved issues associated with the former. We are scanning individual's ear and storing it in passport database. If a person comes then his or her ear image is captured and compared to image in database. If the input image matches with the image in database then a positive result is generated to authenticate the person.

KEYWORDS: SIFT algorithm, Wavelet algorithm, Biometrics, Ear

I.INTRODUCTION

An electronic international ID (e-Passport) is a distinguishing proof record which has pertinent biographic and biometric data of its carrier. It likewise has inserted in it a Radio Frequency Identification (RFID) Tag which is fit for cryptographic usefulness. The effective execution of biometric advancements in reports, for example, e-Passports plans to reinforce outskirt security by diminishing falsification and setting up without uncertainty the personality of the archives' carrier.

The e-Passport additionally offers considerable advantages to the legitimate holder by giving increasingly modern methods for affirming that the visa has a place with that individual and that it is genuine, without risking protection. The states are right now issuing e-Passports, which compares to over half of all international IDs being issued around the world. This speaks to an incredible upgrade in national and worldwide security as it enhances the trustworthiness of travel papers by the need to coordinate the data contained in the chip to the one imprinted in the report and to the physical attributes of the holders and empowers machine-helped check of biometric and biographic data to affirm the personality of explorers.

The e-Passport standard gives insights concerning setting up a protected correspondence between an e-Passport and an Inspection System (IS), the validation of an e-Passport, subtleties on capacity components and biometric identifiers that ought to be utilized. The computerized photo of the individual gives a facial biometric that can be utilized for mechanized ID forms by utilizing facial acknowledgment innovation. Most usage of the e-Passports by different nations have a solitary identifier just, the facial biometric. In any case, the chip has adequate ability to incorporate expansions, for example, face, fingerprints and iris biometrics.

II.RELATED WORKS

1.Kai Cao and Anil K.Jain ,Fellow, "Automated Latent Fingerprint Recognition",Published on 22 March 2018 in IEEE TRANSACTIONS on Pattern Analysis and Machine Intelligence.

Latent fingerprints are a champion among the most essential and by and large used evidence in law prerequisite and criminological workplaces around the globe. In any case, NIST appraisals show that the execution of stand out inert affirmation structures is far from agreeable. An automated inactive unique finger impression affirmation system with high exactness is fundamental to differentiate latents found at bad behavior scenes with a huge get-together of reference prints to deliver a candidate summary of possible mates. In this paper, we propose an automated inactive unique finger impression affirmation computation that utilizes Convolutional Neural Networks for edge stream estimation and points of interest descriptor extraction, and concentrate correlative arrangements (two subtleties designs and one surface organization) to address the idle. The examination between the idle and a reference print subject to the three organizations are merged to recuperate a short confident once-over from the reference database.

2.Ping Yan and Kevin W. Bowyer, Fellow, "Biometric Recognition Using 3D Ear Shape", Published on August 2007 in IEEE TRANSACTIONS on Pattern Analysis and Machine Intelligence, vol 29,no

The ear is a promising possibility for biometric recognizable proof. In any case, in earlier work, the preprocessing of ear pictures has had manual advances

and calculations have not really taken care of issues brought about by hair and hoops. We present a total framework for ear biometrics; including robotized division of the ear in a profile sees picture and 3D shape coordinating for acknowledgment. We assessed this framework with the biggest test concentrate to date in ear biometrics, accomplishing a rank-one acknowledgment rate of 97.8 percent for a recognizable proof situation and an equivalent blunder rate of 1.2 percent for a confirmation situation on a database of 415 subjects and 1,386 all out tests

3.Takashi Nakamura, Valentin Goverdovsky, Danilo P.Mandic,Fellow, "In-Ear EEG Biometrics for Feasible and Readily Collectable Real-World Person Authentication" Published on March 2018 in IEEE TRANSACTIONS on Information Forensics And Security, vol 13, no.3

The utilization of electroencephalogram (EEG) as a bio-measurements methodology has been researched for about a decade; however, its possibility in certifiable applications isn't yet convincingly settled, principally because of the issues with collectability and reproducibility. To this end, we propose a promptly deployable EEG biometrics framework dependent on a "one-fits-all" visco elastic generic in-ear EEG sensor (collectability), which does not require skilled assistance or awkward planning. In contrast to most existing investigations, we consider information recorded over numerous chronicle days and for various subjects (reproducibility) while, for meticulousness, the preparation and test sections are not taken from a similar account days. A hearty methodology is viewed as dependent on the resting state with eyes shut worldview, the utilization of both parametric (autoregressivemodel) and non-parametric (ghostly) highlights, and supported by basic and quick cosine remove, straight discriminate analysis, and bolster vector machine classifiers. Both the confirmation and identification legal sciences situations are considered and the accomplished outcomes are keeping pace with the examinations dependent on unreasonable on-scalp recordings. Thorough investigation over various subjects, setups, and examination highlights exhibits the possibility of the proposed ear-EEG biometrics, and its potential in settling the basic collectability, vigour, and reproducibility issues related with current EEG biometrics.

4.Chang , K., Bowyer, K., Sarkar, S., And Victor. B, "Comparison and Combination Of Ear And Face Images In Appearance Based Biometrics" published on 2003 in IEEE TRANSACTIONS on Pattern Analysis And Machine Intelligence, vol 25.
The ear may have points of interest over the face for biometric acknowledgment. Our past examinations with ear and face acknowledgment, utilizing the standard foremost part investigation approach, indicated lower acknowledgment execution utilizing ear pictures. We report consequences of comparative analyses on bigger informational indexes that are all the more thoroughly controlled for relative nature of face and ear pictures. We find that acknowledgment execution isn't fundamentally unique between the face and the ear, for instance, 70.5 percent versus 71.6 percent, separately, in one investigation. We additionally find that multimodal acknowledgment utilizing both the ear and face results in measurably huge enhancement over either individual biometric, for instance, 90.9 percent in the undifferentiated from investigation

5. Yun-Fu-Liu ,Jing-Ming Guo ,Po-Hsien Liu,Jiann -Der Lee, and Chen-Chieh Yao, "Panoramic Face Recognition",Published on August 2018 in IEEE TRANSACTIONS on Circuits and Systems For Video Technology.

Displaying 3D face is a viable route for posture invariant acknowledgment, yet its costly calculation altogether disheartens potential applications. In this paper, a straightforward and completely programmed all encompassing picture based posture invariant face acknowledgment technique is proposed to give astounding exactness low multifaceted nature. In this paper, a face shape show with neighborhood transforming treatment is first built and considered as the arrangement standard to manage the majority of the conceivable geometric bending issues. Amid the acknowledgment stage, a proposed efficiently structured calculation with transforming and the determination work are both used to fundamentally facilitate the negative impacts of different stances inside ±45° in yaw and ±22.5° in pitch. As exhibited in trial results, a comparable exactness as that of the 3D beginning of expressions of the human experience is accomplished with considerably less computational multifaceted nature.

III.EXISTING SYSTEM

Biometric innovation can perceive an individual based on the one of a kind highlights of their face, unique mark, mark, DNA or iris example and afterward confer a protected and advantageous technique for confirmation purposes. Biometrics is along these lines the estimation and factual examination of an individual's physical and conduct qualities. For instance, voice acknowledgment frameworks work by estimating the attributes of an individual's discourse as air is ousted through their lungs, over the larynx and out through their nose and mouth .The discourse check programming will contrast these qualities and information previously put away on the server and in the event that the two voiceprints are adequately comparable, the biometric security framework will at that point announce it a match. In face recognition technology, the camera edge affects whether or a not a face is prepared. All together for a facial acknowledgment framework to totally distinguish a

face, it needs various edges, including profile, frontal, 45 degree and that's just the beginning, to guarantee the most precise coming about matches. Likewise, any impediments, for example, facial hair or caps, can cause some inconvenience. To keep any mishaps or disappointments, it's best to guarantee that the database is always refreshed and fully informed regarding its information.

IV.PROPOSED SYSTEM

The primary point of the undertaking is to build up a biometric verification framework utilizing the ear. The procedure will include a few stages from obtaining of the picture to the point where a positive recognizable proof can be made utilizing the framework. The picture was obtained utilizing an advanced camera. The photograph is then prepared, put away and utilized for the ID procedure. For each person, there are some particular highlights that can be utilized for distinguishing proof. The part or portion that contains these novel highlights is known as the Region of Interest. After the crude information is gotten, the Region of Interest (ROI) which is the region containing the ear picture is chosen. Feature extraction sift the uniqueness information through of the crude information and joins them into the biometric include The strategy connected for this is Edge location. For "simple" pictures from the database mistake free acknowledgment was gotten. At the point when all the outer conditions, for example, lighting are viably controlled and stay steady, all the framework creates an ideal execution with precise outcomes constantly.

V. STRUCTURAL SCHEME

1.BLOCK DIAGRAM

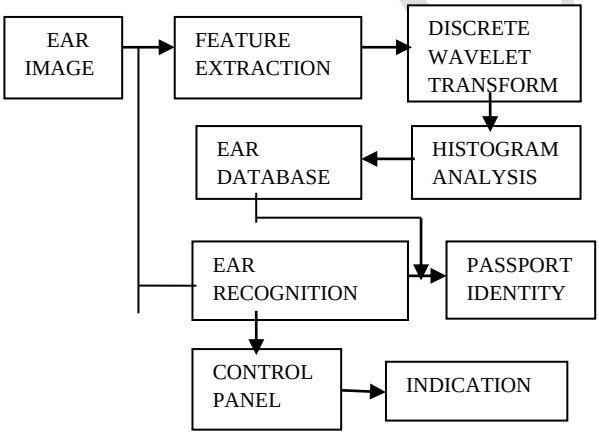

Fig .1. Block Diagram for Ear Recognition

2. FEATURE EXTRACTION

The scale-invariant component change (SIFT) is an element location calculation in PC vision to recognize and portray neighborhood includes in pictures. Applications incorporate item acknowledgment, mechanical mapping and route, picture sewing, 3D displaying, signal acknowledgment, video following, singular distinguishing proof of untamed life and match moving. Filter key points of articles are first extricated from a lot of reference pictures and put away in a database. An item is perceived in another picture by exclusively contrasting each element from the new picture to this database and discovering competitor coordinating highlights dependent on Euclidean separation of their component vectors. From the full arrangement of matches, subsets of key points that concede to the article and its area, scale, and introduction in the new picture are recognized to sift through great matches. The assurance of predictable groups is performed quickly by utilizing a productive hash table execution of the summed up Hough change. Each bunch of at least 3 includes that concede to an item and its posture is then subject to additionally point by point show check and thusly exceptions are disposed of. At last the likelihood that a specific arrangement of highlights shows the nearness of an article is registered, given the exactness of fit and number of plausible false matches. Item coordinates that breeze through every one of these tests can be distinguished as right with high certainty.

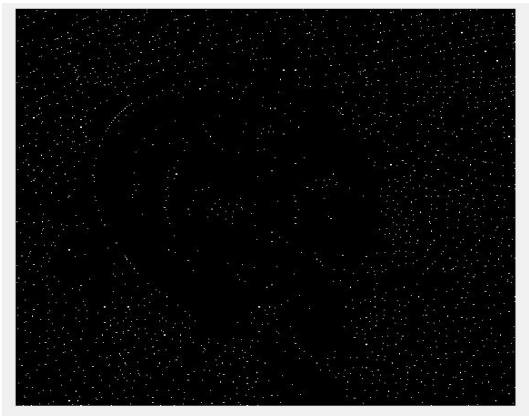

Fig.2.Detection of Edges using SIFT Algorithm

3. DISCRETE WAVELET TRANSFORM

The discrete wavelet change (DWT) is a usage of the wavelet change utilizing a discrete arrangement of the wavelet scales and interpretations complying with some characterized guidelines. At the end of the day, this change decays the flag into commonly symmetrical arrangement of wavelets, which is the principle contrast from the persistent wavelet change (CWT), or its execution for the discrete time arrangement in some

cases called discrete-time consistent wavelet change (DT-CWT). The wavelet can be developed from a scaling capacity which portrays its scaling properties. Th limitation that the scaling capacities must be symmetrical to its discrete interpretations infers some numerical conditions on them which are referenced all over, for example the dilation equation,

$$\phi(x) = \sum_{k=-\infty}^{\infty} a_k \phi(Sx - k)$$

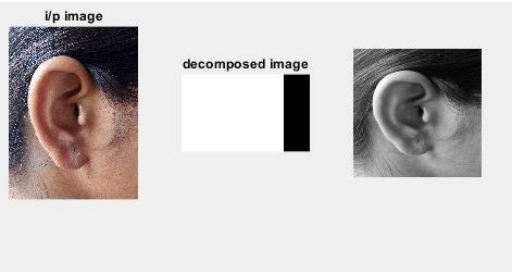

Fig.3. Decomposed Image Using DWT

4. HISTOGRAM ANALYSIS

A picture histogram is a sort of histogram that goes about as a graphical portrayal of the tonal dissemination in a computerized image.It plots the quantity of pixels for each tonal esteem. By taking a gander at the histogram for a particular picture a watcher will most likely judge the whole tonal dispersion initially. Picture histograms are available on numerous cutting edge advanced cameras. Picture takers can utilize them as a guide to demonstrate the circulation of tones caught, and whether picture detail has been lost to extinguished features or passed out shadow. This is less helpful when utilizing a crude picture design, as the dynamic scope of the showed picture may just be a guess to that in the crude file.

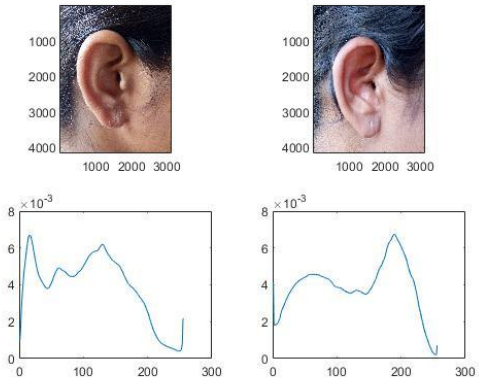

Fig.4.Comparison of Ear Images using Histogram Analysis

VI.EXPERTIMENT RESULTS:

In the wake of interfacing the controller (PIC16F877a) with the code, it encodes and decodes the data. The simple flag can be specifically given to the PIC subsequently there is no requirement for outside analog to digital convertor .If the input image is coordinated with the ear database it demonstrates "authenticated" in the LCD show Otherwise it indicates "unauthenticated". It effectively recognizes the verified individual by utilizing ear biometrics.

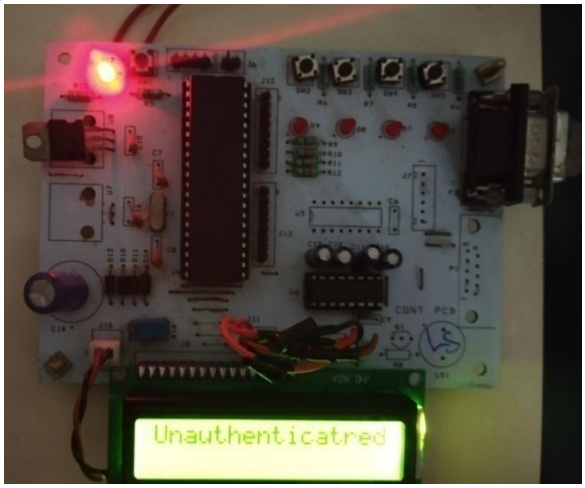

Fig.5.Hardware Implementation using LCD Display

VII.CONCLUSION

The proposed identification technique for database is an efficient approach to partition the biometric database to reduce the data retrival during identification. The proposed recognition technique based on discrete wavelet transform is an efficient scheme to match images which are robust against compressions and other attacks. The future scope of the proposed system can be

tested for large database and on other biometric traits. The system can also be tested for scalability issues. To futher strengthen the robustness of the system, it may be tested on multiple modalities.

VIII.REFERENCES

[1] P. Besl and N. McKay, "A Method for Registration of 3-D Shapes,"IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 14,pp. 239-256, 1992.

[2] P.J. Besl and R.C. Jain, "Invariant Surface Characteristics for 3D Object Recognition in Range Images," Computer Vision Graphics Image Processing, vol. 33, pp. 30-80, 1986.

[3] B. Bhanu and H. Chen, "Human Ear Recognition in 3D," Proc.Workshop Multimodal User Authentication, pp. 91-98, 2003.

[4] M. Burge and W. Burger, "Ear Biometrics in Computer Vision,"Proc. 15th Int'l Conf. Pattern Recognition, vol. 2, pp. 822-826,2000.

[5] K. Chang, K. Bowyer, and V. Barnabas, "Comparison and Combination of Ear and Face Images in Appearance-Based Biometrics," IEEE Trans.Pattern Analysis and Machine Intelligence, vol. 25, pp. 1160-1165,2003.

[6] H. Chen and B. Bhanu, "Human Ear Detection from Side Face Range Images," Proc. Int'l Conf. Image Processing, pp. 574-577, 2004.

[7] H. Chen and B. Bhanu, "Contour Matching for 3D Ear Recogni-tion,"Proc. Seventh IEEE Workshop Application of Computer Vision,pp. 123-128, 2005.

[8] Y. Chen and G. Medioni, "Object Modeling by Registration of Multiple Range Images," Image and Vision Computing, vol. 10,pp. 145-155, 1992.

[9] M. Choras, "Ear Biometrics Based on Geometrical Feature Extraction,"Electronic Letters on Computer Vision and Image Analysis, vol. 5,pp. 84-95, 2005.

[10] M. Choras, "Further Developments in Geometrical Algorithms for Ear Biometrics," Proc. Fourth Int'l Conf. Articulated Motion and Deformable Objects, pp. 58-67, 2006.

[11] L.D. Cohen, "On Active Contour Models and Balloons," Computer Vision, Graphics, and Image Processing. Image Understanding, vol. 53, no. 2, pp. 211-218, 1991.

[12] D. Cremers, "Statistical Shape Knowledge in Variational Image Segmentation," PhD dissertation, Dept. of Math. and Computer Science,

Univ. of Mannheim, Germany, July 2002.P. Flynn and A. Jain, "Surface Classification: Hypothesis Testing and Parameter Estimation," Proc. IEEE Conf. Computer Vision Pattern Recognition, pp. 261-267, 1988.

[13] R.-L. Hsu, M. Abdel-Mottaleb, and A. Jain, "Face Detection in Color Images," IEEE Trans. Pattern Analysis and Machine Intelli-gence,vol. 24, pp. 696-706, 2002.

[14] D. Hurley, M. Nixon, and J. Carter, "Force Field Energy Functionals for Image Feature Extraction," Image and Vision Computing J., vol. 20,pp. 429-432, 2000

[15] H.-Y. Shum, M. Hebert, K. Ikeuchi, and R. Reddy, "An Integral Approach to Free-Form Object Modeling," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 19, pp. 1366-1370, 1997

[16] C. Xu and J. Prince, "Snakes, Shapes, and Gradient Vector Flow,"IEEE Trans. Image Processing, vol. 7, pp. 359-369, 1998.