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A Review: Ear Biometrics

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Abstract: *To an automatic authentication to individual the biometric is an active pitch. Ear recognition is attracting the interest of researchers as its clear physiological appearance and identical structure for a long period. So it In this paper study has been going on to explore the ear as a biometric treat to authenticate individual for that concern here primarily twelve papers are selected. Reviving these papers we observe that different techniques used by authors. In this research related study we note down robust techniques used for the recognition purposes. These papers provide advantages and disadvantages of various used approach for processing, extraction and classification of image data.*
This literature review has seven sections these are keywords, introduction, and literature review, used techniques, findings and conclude part.
Keywords: *SIFT, 2D, 3D, USTB, FRGCv2, DB, WPUTE, SCFace, KD, UND, NCC, HAAR, GF, Recognition, Findings Techniques etc.*

I. Introduction

Biometrics mentions authentication on the basis of metrics related to human characteristics. Biometrics authentication is used in computer science as a form of identification and to specify the accesses. It is also used to identify individuals in groups that are under observation. Biometric identifiers are the exceptional, measurable characteristics used to tag and describe individuals. Biometric identifiers are often categorized as physiological versus behavioural characteristics. Now days simple biometric applications are involved in various technologies, up gradation may be possible using multi-model biometrics. In biometrics generally the trained sample required to store in database where the recent captured image matches using suitable algorithms .Ear recognition might be a good solution since ear is visible; ear images are easy to be taken, and the ear structure does not change radically over time [9].In the context of biometric verification, ('parametric') normalisation techniques, which assume that the matching score is drawn from a Gaussian-shaped distribution and that adjusting this distribution to zero mean and unit variance successfully alleviates the score-variation problem, have emerged as the most popular [5].

II. Literature Review

Table 1: Literature Review

Authors Name	Title & Year	Techniques	Findings	References
J. Zhou, S. Cadavid et al.	Exploiting color SIFT features for 2D ear recognition, 2012	* 2D Ear image recognize using SIFT Feature. * Scale Invariant Feature Transform algorithm originally performed on the intensity channel to the RGB color channels to maximize the SIFT feature descriptor.	* The method can achieve better recognition rates than the state-of-the-art methods applied on the same datasets.	[1]
N. Poh, A. Rattani and F. Roli,	Critical analysis of adaptive biometric systems, 2012	* Adaptive biometrics First, novel attributes that distinguish an adaptive system from one another are introduced. Second, meta-analysis is utilised to aid analysis of various state-of-the-art adaptive systems. * Supervised against semi-supervised.	* Identifying key attributes related to adaptive biometric Systems. *Identified novel researchdirections* advance the state-of-the-art and improve the quality of	[2]

		* Self- against co-train. * Verification against identification. * Level of adaptation	discourse in this field.	
A. Pflug and C. Busch.	Ear biometrics: a survey of detection, feature extraction and recognition methods, 2012	* USTB databases. * IIT Delhi Database. * IITK database. * Youngston State University DB.	* Authors categorize and summarize approaches to ear detection and recognition in 2D and 3D images on the basis of collected structured survey of available databases.	[3]
B. Zhang, Z. Mu, C. Jiang and J. Dong.	A robust algorithm for ear recognition under partial occlusion, 2013	* Over-complete non-negative sparse representation based Classification *USTB ear database	Experimental results show that when ear is partially occluded, NSRC exhibits more robustness and achieve state of the art recognition performance	[4]
V. Struc, J. Zganec-Gros, B. Vesnicerand N. Pavesic.	Beyond parametric score normalization in biometric verification systems, 2014	* To mitigate these variations, score-normalization techniques, such as the z-norm, the t-norm or the zt-norm, are commonly adopted. * FRGCv2 and SCFace databases used.	*Demonstrated that parametric and non-parametric normalization techniques can be combined into hybrid normalization schemes to provide a trade-off between the computational complexity and the performance	[5]
S. Maity and M. Abdel-Mottaleb.	3D Ear Segmentation and Classification Through Indexing, 2015	* Indexing techniques with balanced split (k-dimensional (KD) tree) and unbalanced split (pyramid tree) data structures to categorize the database separately and then compared their retrieval efficiency. * UND database collection J2.	* with this techniques author observed that the recognition efficiency time is 3-5 times faster.	[6]
Ghoualmi, A. Draa and S. Chikhi.	An efficient feature selection scheme based on genetic algorithm for ear biometrics authentication, 2015	*In feature extraction stage, Gabor Filter, Genetic Algorithm and Principle Component Analysis (PCA). *Normalized Cross-correlation (NCC) to measure the similarity between the templates collected during the enrollment phase and the claiming users.	* By GA based Approach it improve the performance of the biometric system and allows reducing the feature size. However, the combination of the GA and	[7]

		*USTB database.	PCA reduce the feature size but the performance of the biometrics system is less than the proposed GA based approach	
S. Tiwari, S. Kumar, S. Kumar and G. R. Sinha.	Ear recognition for newborns, 2015	* Newborns recognition using 2D image. * PCA,ICA, LDA, GF and HAAR to extract features at different level of Gaussian pyramid.	* Two methods GF and HAAR to increase the accuracy. * The accuracy of proposed algorithm on database of 210 newborn is 89.28% observed.	[8]
A. S. Anwar, K. K. A. Ghany and H. ElMahdy.	Human ear recognition using SIFT features, 2015	* SIFT algorithm *Gaussian filter *IIT Delhi database. * AMI database.	The experimental results observed compared with other researchers and obtained over all accuracy almost 95.2 % on IIT Delhi database.	[9]
C. Rathgeb, A. Pflug, J. Wagner and C. Busch.	Effects of image compression on ear biometrics, 2015	*Local binary patterns *Local phase quantisation *Histogram of oriented gradients. *Binaries statistical image features	conclude that biometric performance obtained on compressed images rather depends on the employed feature extractor than on the applied image compression technique.	[10]
R. Khorsandi, A. Taalimi and M. Abdel-Mottaleb.	Robust biometrics recognition using joint weighted dictionary learning and smoothed L0 norm, 2015	* Notre Dame (UND) datasets. * West Virginia University dataset. *Classification based on Sparse Representation. *Histogram of Oriented Gradient *Notre Dame (UND) dataset collection J2 * Smoothed L0 norm	* the obtained result show significant improvement in the recognition accuracy.	[11]
M. Oravec*et al*.	Mobile ear recognition application, 2016	*Local Binary Patterns *Principal Component Analysis * Euclidean or chi-square distance * WPUTE database	* Author created application which based on LBP and PCA algorithms for feature extraction.	[12]

III. Conclusion

Here workout on near about twelve research papers. In this research related study we note down robust techniques used for the recognition purposes and its outcome result that is findings clearly mentioned in above section i.e. Literature Review Table. These papers provide advantages and disadvantages of various used approach for processing, extraction and classification of image data. They provide an outlook over possible

future research in the field of ear recognition, in the context of smart surveillance.

References

[1]. J. Zhou, S. Cadavid and M. Abdel-Mottaleb, "Exploiting color SIFT features for 2D ear recognition," 2011 18th IEEE International Conference on Image Processing, Brussels, 2011, pp. 553-556.doi: 10.1109/ICIP.2011.6116405.
[2]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6116405&isnumber=6115588.
[3]. N. Poh, A. Rattani and F. Roli, "Critical analysis of adaptive biometric systems," in IET Biometrics, vol. 1, no. 4, pp. 179-187, December 2012.doi: 10.1049/iet-bmt.2012.0019.
[4]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6403227&isnumber=6403226.
[5]. A. Pflug and C. Busch, "Ear biometrics: a survey of detection, feature extraction and recognition methods," in IET Biometrics, vol. 1, no. 2, pp. 114-129, June 2012.doi: 10.1049/iet-bmt.2011.0003.
[6]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6247060&isnumber=6247056.
[7]. B. Zhang, Z. Mu, C. Jiang and J. Dong, "A robust algorithm for ear recognition under partial occlusion," Proceedings of the 32nd Chinese Control Conference, Xi'an, 2013, pp. 3800-3804.
[8]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6640082&isnumber=6639389.
[9]. V. Struc, J. Zganec-Gros, B. Vesnicer and N. Pavesic, "Beyond parametric score normalisation in biometric verification systems," in IET Biometrics, vol. 3, no. 2, pp. 62-74, June 2014. doi: 10.1049/iet-bmt.2013.0076.
[10]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6828584&isnumber=6828580.
[11]. S. Maity and M. Abdel-Mottaleb, "3D Ear Segmentation and Classification Through Indexing," in IEEE Transactions on Information Forensics and Security, vol. 10, no. 2, pp. 423-435, Feb. 2015. doi: 10.1109/TIFS.2014.2379437.
[12]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6980457&isnumber=7000004.
[13]. L. Ghoualmi, A. Draa and S. Chikhi, "An efficient feature selection scheme based on genetic algorithm for ear biometrics authentication," 2015 12th International Symposium on Programming and Systems (ISPS), Algiers, 2015, pp. 1-5.doi: 10.1109/ISPS.2015.7244991.
[14]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7244991&isnumber=7244951
[15]. S. Tiwari, S. Kumar, S. Kumar and G. R. Sinha, "Ear recognition for newborns," 2015 2nd International Conference on Computing for Sustainable Global Development (INDIACom), New Delhi, 2015, pp. 1989-1994.
[16]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7100590&isnumber=7100186.
[17]. A. S. Anwar, K. K. A. Ghany and H. ElMahdy, "Human ear recognition using SIFT features," 2015 Third World Conference on Complex Systems (WCCS), Marrakech, 2015, pp. 1-6. doi: 10.1109/ICoCS.2015.7483254.
[18]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7483254&isnumber=7483210.
[19]. C. Rathgeb, A. Pflug, J. Wagner and C. Busch, "Effects of image compression on ear biometrics," in IET Biometrics, vol. 5, no. 3, pp. 252-261, 9 2016.doi: 10.1049/iet-bmt.2015.0098.
[20]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7542786&isnumber=7542781.
[21]. R. Khorsandi, A. Taalimi and M. Abdel-Mottaleb, "Robust biometrics recognition using joint weighted dictionary learning and smoothed L0 norm," 2015 IEEE 7th International Conference on Biometrics Theory, Applications and Systems (BTAS), Arlington, VA, 2015, pp. 1-6. doi: 10.1109/BTAS.2015.7358792.
[22]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7358792&isnumber=7358743.
[23]. M. Oravecet al., "Mobile ear recognition application," 2016 International Conference on Systems, Signals and Image Processing (IWSSIP), Bratislava, 2016, pp. 1-4. doi: 10.1109/IWSSIP.2016.7502719
[24]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7502719&isnumber=7502689
[25]. R. Kaur, H. Kaur and S. Bhushan, "Implementation of ICA based score level fusion of iris and ear biometrics," 2016 3rd International Conference on Computing for Sustainable Global Development (INDIACom), New Delhi, 2016, pp. 3192-3196. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7724854&isnumber=7724213.
[26]. L. Zhang, L. Li, H. Li and M. Yang, "3D Ear Identification Using Block-Wise Statistics-Based Features and LC-KSVD," in IEEE Transactions on Multimedia, vol. 18, no. 8, pp. 1531-1541, Aug. 2016. doi: 10.1109/TMM.2016.2566578
[27]. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7467559&isnumber=7514289.