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Abstract

Human iris is one of the most reliable biometric because of its uniqueness, stability and noninvasive nature. Thus it has attracted the attention of biometrics based identification and verification research and development community. In this paper, a new approach of iris image feature extraction technique based on the statistical properties of Discrete Cosine Transform (DCT) domain is proposed. A Canny Edge Detection followed by Hough Transform is used to detect the iris boundaries in the eye's digital image. The two level Discrete Wavelet Transformation (DWT) is applied on the segmented and normalized iris region. Both second level horizontal and vertical detail sub-bands are used for encoding unique iris feature. Each of those frequency sub-bands is divided into 8x8 non-overlapping blocks and DCT is applied to each block. Unique iris features are obtained by comparing the energies containing in corresponding DCT blocks of both the sub-bands. These features extracted are used to generate unique encoded binary image and corresponding unique binary bit stream/code is constructed. In order to reduce the size of the database, this binary bit stream instead of binary image is stored in database for matching purpose. Further to increase the security of the system, the bit stream obtained is first encrypted using the user key obtained from user password and then the encrypted bit pattern template is stored. Experimental results on Iris Database reveal that the proposed iris matching scheme provides results comparable to those of recent methods and is also computationally effective.

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- J. Daugman, "High confidence visual recognition of persons by a test of statistical independence," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 15, no. 11, pp. 1148–1161, 1993.
- R. Wildes, "Iris recognition: An emerging biometric technology," Proceedings of the IEEE, vol. 85, no. 9, pp. 1348–1363, 1997.
- J. Daugman, "How iris recognition works," IEEE Trans. Circuits Syst. Video Techn., vol. 14, no. 1, pp. 21–30, 2004.
- R. Sanchez-Reillo and C. Sanchez-Avila, "Iris recognition with low template size," in AVBPA, ser. Lecture Notes in Computer Science, J. Bigun and F. Smeraldi, Eds., vol. 2091. Springer, 2001, pp. 324–329.
- Liu Yang, Yue Xue Dong, Liu Ying Fei and He Yan, "Iris Recognition System Based on Chaos Encryption," IEEE International Conference on Computer Design and Applications, vol 1, pp. 537-539, 2010.
- S. V. Sheela, P. A. Vijaya, "Iris Recognition Methods – Survey", International Journal of Computer Applications, 2011.
- Zhonghua Lin and Bibo Lu, "Iris Recognition Method Based on the Imaginary Coefficients of Morlet wavelet Transform," Seventh IEEE international Conference on Fuzzy Systems and Knowledge Discovery, pp. 573-577, September 2010.
- Jing Huang, Xinge You, Yuan Yan Tang, "Iris Recognition Based on Non Separable Wavelet," IEEE International Conference on Systems, Man and Cybernetics, pp. 1552-1557, 2008
- Mohammed A M Abdullah, F H A Al-Dulaimi, Waleed Al-Nuaimy and Ali Al-Ataby, "Smart Card with Iris Recognition for High Security Access Environment," IEEE International Conference on Biomedical Engineering, pp. 382-385, 2011.
- D. Monro, "Bath University iris database," University of Bath, Bath, School of Electronic and Electrical Engineering, 2008, <http://www.bath.ac.uk/elec-eng/research/sipgl>.
- Li Ma, Tieniu Tan, Yunhong Wang, Dexin Zhang, "Personal Identification based on Iris Texture Analysis", IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol.25, No.12, pp. 1519 – 1533, 2003.
- Beauchamp, K.G., 1984, "Applications of Walsh and Related Functions: with an Introduction to Sequency Theory", Academic Press, London, 295-300.
- Zhihua, L. and Qishan, Z., 1983, "Ordering of Walsh functions", IEEE Transactions on Electromagnetic Compatibility, 2, 115–119.
- Brown, R.D., 1977, "A recursive algorithm for sequency-ordered fast Walsh transforms", IEEE Transactions on Computers, C-26, 8, 819–822.
- C.Anand Deva Durai, M.Karnan, "Iris Recognition Using Modified Hierarchical Phase-Based Matching (HPM) Technique", IJCSI International Journal of Computer Science Issues, Vol. 7, Issue 3, No 8, May 2010
- L. Ma, T. Tan, Y. Wang, and D. Zhang, "Personal Identification Based on Iris Texture Analysis," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 25, pp. 1519-1533, 2003.
- L. Ma, T. Tan, Y. Wang, and D. Zhang, "Efficient Iris Recognition by Characterizing Key

Local Variations,” IEEE Transaction Image Processing, vol. 13, pp. 739-750, 2004.

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Index Terms

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