Combining Iris, Sclera and Pupil Features for Biometric Authentication System on Smartphone Devices

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Abstract: *Currently, biometric authentication systems are commonly used based on physical and behavioural biometric modalities like iris, face, fingerprints, ear, sclera, DNA, voice, signature, etc. Rather than relying on the standalone or unimodal biometric system, multimodal biometric systems are secure and provide more accurate results for person identification and verification. This paper introduces the multimodal eye biometric authentication system where iris, pupil and sclera features are extracted using CNN based on entropy values to perform the accurate automatic segmentation for smartphone devices. The eye images used in the proposed approach for training and testing are completely captured by smartphones. The fusion method used to fuse the colour and texture characteristics of iris and pupil with Y-shaped sclera characteristics from eye image based on support value is Feature Level Fusion. As the images are captured in normal environment settings, it is an unconstrained colour eye image database. MATLAB is used for the experimentation and testing of the model. The proposed eye biometric system outperforms in the case of segmentation and recognition accuracy. Recognition accuracy is –% for unconstrained eye images achieved for the eye image database captured by smartphones.*

Keywords: Entropy based Convolutional Neural Network, Multimodal Biometric Systems, Unimodal, Feature Level Fusion

REFERENCES

[1]. Multimodal Biometric System Iris and Fingerprint Recognition Based on Fusion Technique Abdullah Ahmed, Ahmed Shamil Mustafa International Journal of Advanced Science and Technology

[2]. Multimodal Biometric Authentication for VR/AR using EEG and Eye Tracking Vrishab Krishna Research Mentorship ProgramSanta Barbara, California, USA

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[4]. Support Value Based Fusion Matching using Iris,Sclera Features for Person Authentication in Unconstrained Environment.

[5]. Feature Level Fusion of Iris and Sclera using Entropy Based CNN Features to Improve the Performance of Biometric Authentication.

[6]. Robust Multimodal Biometric Authentication Integration Iris,Face and Palmprint Fenghua Wang, Jiuqiang Han School of Electronics and Information Engineering, Xi'an Jiaotong University 710049 Xi'an, China.

[7]. A.K.Jain, A.Ross S. Prabhakar: An Introduction to biometric recognition, IEEE Trans., Circuit systems and Video Technol., 14(1)(2004),pp 4-20

[8]. Sharma ,R. Pavlovic, V. I. , Huang, T.S.: Towards multimodal Human computer interface. In Proceeding IEEE, 86(5),pp.853-860(1998).

[9]. Ross , A. Jain : Information fusion in biometrics, Journal of pattern recognition letters, vol 24, no.13,pp. 2115-2125,Sep 2003.

[10]. Pradeep Atrey, Anwar Houssain,Abdulmotaleb Saddik, Mohan kankanhalli , Multimodal fusion for multimedia analysis: A survey, Springer trans. multimedia systems (2010), 16: 345-379 [11] A. A. RossRGovindarajan: Feature level fusion using hand and face biometrics, Proc SPIE, Vol. 5779.,pp .

[11]. L. Hong, A.Jain : Integrating face and fingerprints for personal identification, IEEE Trans., Pattern Anal. Match. Intell, vol. 20, no. 1, pp. 1295-1307, Dec 1998 .

[12]. Giorgio Giacinto , Fabio Roli ,Et Dynamic Classifier Selection based on Multiple Classifier Behaviour. Pattern recognition. 34((),179-181(2001).

[13]. Giorgio Giacinto , Fabio Roli ,Et Dynamic Classifier Selection based on Multiple Classifier Behaviour. Pattern recognition. 34((),179-181(2001)

[14]. Aguilar, J.F., Garcia, J.O., Romero, D.G., Rodriguez, J.G.: A comparative evaluation of fusion strategies for multimodal biometric verification. In International conference on video based biometric person authentication, pp., 830-837,Guildford(2003)

[15]. Y. Zheng and A. Elmaghraby, "A Brief Survey on Multispectral lFace Recognition and Multimodal Score Fusion," in Proc. of IEEE International Symposium on Signal Processing and Information Technology (ISSPIT), Bilbao, pp. 543-550, 14-17 Dec 2011.

[16]. D. Kisku, A. Rattani, P. Gupta and J. Sing, Biometric Sensor Image Fusion for Identity Verification: A Case Study with Wavelet-Based Fusion Rules Graph Matching, in Proc. of IEEE Conference on Technologies for Homeland Security, HST '09, Boston, pp. 433-439, 11 -12 May 2009.