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

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