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Title : Biometric Identification and Recognition for IRIS using Failure Rejection Rate (FRR)

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Iris recognition is reckoned as one of the most reliable biometrics for identification purpose in terms of reliability and accuracy. Hence, the objectives of this research are new algorithms development significantly for iris segmentation specifically the proposed Fusion of Profile and Mask Technique (FPM) specifically in getting the actual center of the pupil with high level of accuracy prior to iris localization task, followed by a particular enhancement in iris normalization that is the application of quarter size of an iris image (instead of processing a whole or half size of an iris image) and for better precision and faster recognition with the robust Support Vector Machine (SVM) as classifier. Further aim of this research is the integration of cancelable biometrics feature in the proposed iris recognition technique via non-invertible transformation which determines the feature transformation-based template protection techniques security. Therefore, it is significant to formulate the non-invertibility measure to circumvent the possibility of adversary having the capability in guessing the original biometric providing that the transformed template is obtained. At any process of recognition stage, the biometric data is protected and also whenever there is a compromise to any information in the database it will be on the cancelable biometric template merely without affecting the original biometric information. In

order to evaluate and verify the effectiveness of the proposed technique, CASIA-A (version 3.1) and Bath-A iris databases have been selected for performance testing. Briefly, the processes of the iris recognition system proposed in this research work are locating the pupil first via the novel technique that is the Fusion of Profile and Mask (FPM) Technique focusing on getting the actual center of the pupil then followed by localizing the actual iris region with the circular Hough transform. Next, select smaller yet optimal and effective normalized iris image size by applying different normalization factors. Instead of processing a whole or half size of an iris image, the 480 code size which is equivalent to the quarter size of an iris is selected due to its outstandingly accurate results and less computational complexity. The subsequent step is using the DAUB3 wavelet transform for feature extraction along with the application of an additional step for biometric template security that is the Non-invertible transform (cancelable biometrics method) and finally utilizing the Support Vector Machine (Non-linear Quadratic kernel) for matching/classification. The experimental results showed that the recognition rate achieved are of 99.9% on Bath-A data set, with a maximum decision criterion of 0.97.