Optimal Feature Extraction Dimension in Finger Vein Recognition Using Kernel Principal Component Analysis

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Abstract : In this paper the issue of dimensionality reduction is investigated in finger vein recognition systems using kernel Principal Component Analysis (KPCA). One aspect of KPCA is to find the most appropriate kernel function on finger vein recognition as there are several kernel functions which can be used within PCA-based algorithms. In this paper, however, another side of PCA-based algorithms -particularly KPCA- is investigated. The aspect of dimension of feature vector in PCA-based algorithms is of importance especially when it comes to the real-world applications and usage of such algorithms. It means that a fixed dimension of feature vector has to be set to reduce the dimension of the input and output data and extract the features from them. Then a classifier is performed to classify the data and make the final decision. We analyze KPCA (Polynomial, Gaussian, and Laplacian) in details in this paper and investigate the optimal feature extraction dimension in finger vein recognition using KPCA.

Keywords : biometrics, finger vein recognition, principal component analysis (PCA), kernel principal component analysis (KPCA)

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