Investigation of Dimensionality Reduction in a Finger Vein Verification System

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ABSTRACT

Popular methods of protecting access such as Personal Identification numbers and smart cards are subject to security risks that result from accidental loss or being stolen. Risk can be reduced by adopting direct methods that identify the person and these are generally biometric methods, such as iris, face, voice and fingerprint recognition approaches. In this paper, a finger vein recognition method has been implemented in which the effect on performance has of using principal components analysis has been investigated. The data were obtained from the finger-vein database SDMULA-HMT and the images underwent contrast-limited adaptive histogram equalization and noise filtering for contrast improvement. The vein pattern was extracted using repeated line tracking and dimensionality reduction using principal components analysis to generate the feature vector. A 'speeded-up robust features' algorithm was used to determine the key points of interest and the Euclidean Distance was used to estimate similarity between database images. The results show that the use of a suitable number of principal components can improve the accuracy and reduce the computational overhead of the verification system.

KEYWORDS

Finger vein recognition; Repeated line tracking; Principal component analysis; Speeded-up robust features

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