

Image fusion based multi resolution and frequency partition discrete cosine transform for palm vein recognition

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ABSTRACT

The rapid growth of technology has increased the demand for automated security systems. Due to the accessibility of the palm region and the unique characteristics of each individual's palm vein features, such biometrics have been receiving particular attention. In the published research relating to palm vein biometrics, usually only a single image is used to supply the data for recognition purposes. Previous experimental work has demonstrated that the fusion of multiple images is able to provide richer feature information resulting in an improved classification performance. However, although most of the image fusion techniques are able to preserve the vein pattern, the fused image is often blurred, the colors are distorted and the spatial resolution reduced. In this paper, the multi-resolution discrete cosine transform (MRDCT) and frequency partition DCT (FPDCT) image fusion are applied and are able to extract the finer details of vein patterns while reducing the presence of noise in the image. The performance shows that the use of MRDCT and FPDCT was able to improve recognition rate compared to using a single image. The equal error rate improvement is also significant, falling to 9% in 700nm image, 7% in 850nm image and 6% in 940nm image.

KEYWORDS

Discrete cosine transforms; Veins; Image fusion; Feature extraction; Discrete wavelet transforms; Mathematical model; Image recognition

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