

**Jing, Xiao-Yuan; Yao, Yong-Fang; Zhang, David; Yang, Jing-Yu; Li, Miao**  
**Face and palmprint pixel level fusion and kernel DCV-RBF classifier for small sample biometric recognition.** (English) Zbl 1123.68361  
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**Summary:** Recently, multi-modal biometric fusion techniques have attracted increasing attention to the recognition performance in some difficult biometric problems. The small sample biometric recognition problem is such a research difficulty in real-world applications. So far, most research work on fusion techniques has been done at the highest fusion level, i.e. the decision level. In this paper, we propose a novel fusion approach at the lowest level, i.e. the image pixel level. We first combine two kinds of biometrics: the face feature, which is a representative of contactless biometric, and the palmprint feature, which is a typical contacting biometric. We perform the Gabor transform on face and palmprint images and combine them at the pixel level. The correlation analysis shows that there is very small correlation between their normalized Gabor-transformed images. This paper also presents a novel classifier, KDCV-RBF, to classify the fused biometric images. It extracts the image discriminative features using a Kernel Discriminative Common Vectors (KDCV) approach and classifies the features by using the radial base function network. As the test data, we take two largest public face databases (AR and FERET) and a large palmprint database. The experimental results demonstrate that the proposed biometric fusion recognition approach is a rather effective solution for the small sample recognition problem.

**MSC:**

[68T10](#) Pattern recognition, speech recognition

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**Keywords:**

multi-modal biometric; small sample biometric recognition; face and palmprint; pixel level fusion; Gabor transform; kernel discriminative common vectors; radial base function network; KDCV-RBF classifier

**Software:**

AR face; FERET; UODV

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