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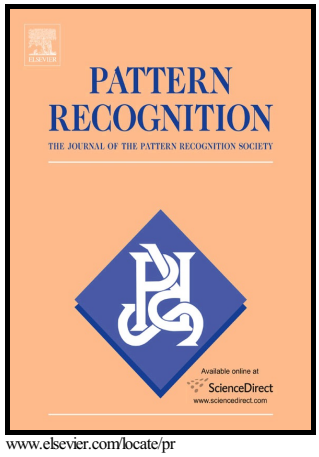

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Abstract

Finger vein recognition has drawn increasing attention from biometrics community due to its security and convenience. In this paper, a novel discriminative binary codes (DBC) learning method is proposed for finger vein recognition. First of all, subject relation graph is built to capture correlations among subjects. Based on the relation graph, binary templates are transformed to describe vein characteristics of subjects. To ensure that templates are discriminative and representative, graph transform is formulated into an optimization problem, in which the distance between templates from different subjects is maximized and templates provide maximum information about subjects. At last, supervised information for training instances is provided by the obtained binary templates, and SVMs are trained as the code learner for each bit. Compared with existing binary codes for finger vein recognition, DBC are more discriminative and shorter. In addition, they are generated with considering the relationships among subjects which may be useful to improve performance. Experimental results on PolyU database and MLA database demonstrate the effectiveness and efficiency of DBC for finger vein recognition and retrieval.

Keywords: Biometric recognition; finger vein recognition; discriminative binary codes learning

1. Introduction

As a fraud-proof biometric, vein pattern has attracted increasing more attention in recent years [1-9]. The vein pattern exists under the skin surface between the roots of the five fingers and the wrist of the palm-dorsum. It is stable and unique. Compared with conventional biometric traits, e.g., fingerprint [10], face [11-16], iris [17], plamprint [18], vein pattern has follow advantages [4, 9, 19, 20]: (1) live body identification. Veins can only be identified on a live body. (2) It is safe. Vein is hidden inside the skin, which is hard to be forged or stolen. Existing vein pattern biometrics mainly includes dorsal hand vein [4-7], palm vein [8, 9] and finger vein. Compared with finger vein and palm vein, dorsal hand vein is more distinctly visible. However, the few vein minutiae can be obtained on the dorsal hand [4]. Palm vein has more abundance of biometric characteristics [9]. For finger vein recognition, adequate vein information can be obtained by using multiple fingers. In addition, finger vein capture device has smaller volume [21], which has more potential for real application, especially for popular mobile application [22].

Finger vein recognition mainly involves two stages: enrollment and verification. As shown in Fig.1, in the enrollment stage, finger vein images of users are first to be captured. After that, image processing methods are employed for enhancing the