ROTATION AND SCALE INVARIANT FEATURE REPRESENTATION FOR DEGRADED PALMPRINTS

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Abstract

Palmprint is one of biometric modalities, which mostly dominated in crime-scenes and access control applications in the past. The majority of the images in access control systems are captured by touch-based sensors using fingertips or palmprint with low-resolution devices whereas the images in forensic scenario are captured as latent prints using high resolution cameras. The issues originate during different types of palmprint acquisition, demand a suitable algorithm to overcome geometric and photometrical variations of acquired images. Full to full, full to partial and latent to full palmprint combinations are different types matching approaches. Full to partial or latent palmprint matching techniques are still being a challenge in forensic applications due to lower quality and nonlinear image distortion as the palmprints comparatively have creases, lines and a larger surface area than fingerprints, which can generate a large number of fake minutiae when the quality of the image is low. Therefore, conventional fingerprint-based algorithms are not directly suitable for such images, and they need some altered tactics to be adopted in the palmprint domain. This research explores an alternate strategy for the use of minutiae-based algorithm where minutiae-like points are used as key features to form a graph for matching images that exhibit large variations in quality through geometrical transformations and partial occlusion. The algorithm is evaluated using partial and full-degraded image segments acquired from publicly available THUPALMLAB database. It is observed that the algorithm performs better with partial and full-degraded palmprint segments. The goal of the algorithm design is to propose a method that can suit for any segment of the hand print. The algorithm proves the principles behind the methodology and demonstrates it has some potential to extend with multiple segments of the hand prints using fusion.

Keywords: Palmprint recognition, minutiae, graph, invariant properties.