Reversible Watermarking Technique for Fingerprint authentication based on DCT

Mohamed Lebcir 1, Suryanti Awang 1, and Ali Benziane 2

1 Soft Computing & Intelligent Systems Research Group (SPINT), Faculty of
Computing, University Malaysia Pahang, UMP, Lebuhraya Tun Razak
26300, Kuantan, Pahang, Malaysia.
2 Faculty of science and Technology, University of Djelfa, Algeria.
mlebcir78@gmail.com

Abstract:
In this paper, a new reversible and blind fingerprint image watermarking technique based on the differential method and discrete cosine transform (DCT) domains is presented. The focus is to increase the security of the fingerprint image in authentication systems. Two DCTtransformed sub-vectors are employed to embed the bits of the watermark sequence in a differential scheme. The original sub-vectors are acquired by the DCT transform on the host fingerprint image. In the extraction process, a minor variance between the sub-vectors that correspond to the watermarked fingerprint image directly allows access to the embedded watermark sequence; therefore, the extraction process doesn't require an original fingerprint. The original fingerprint image is then recovered from the watermarked fingerprint image based on the reversible watermarking technique. The similarity between the reversible fingerprint image and the original is considered, and we could extract minutiae points from it without a problem. The proposed technique is evaluated using 80 fingerprint images from 10 persons for each from FVC2002 fingerprint database. Eight fingerprint images have been taken from each person to be used as the template then the process was followed by embedding the watermark into each fingerprint image. The experimental results validate the proposed method able to give promising results in preserving the fingerprint image security.

Keywords: Fingerprint; Fingerprint Image Watermarking; Frequency Domain; DCT;
 Reversibility

Acknowledgement