A fingerprint matching algorithm using bit-plane extraction method with phase-only correlation

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Abstract: This paper introduces a new method in fingerprint feature extraction based on bit-plane. A bit-plane image requires smaller storage space than a greyscale image. Region of interest (ROI) of a fingerprint image is extracted by using a modified blob analysis method, and then the core point of the ROI is detected for dimension reduction process. Before bit-plane is extracted, the fingerprint image is enhanced by using Fourier transform. Bit-plane 7 of the enhanced image is used as the input for fingerprint matching with phase-only correlation (POC) function. Experiment results showed that the storage space requirement for a fingerprint database could be reduced up to 87% per image for a bit-plane image compared with a greyscale image. The proposed fingerprint matching algorithm achieves 81.16% of recognition rate on FVC2002-Db1a database and 89.78% on FingerDOS database.

Keywords: bit-plane; biometric; feature extraction; fingerprint matching algorithm; phase-only correlation; POC.

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