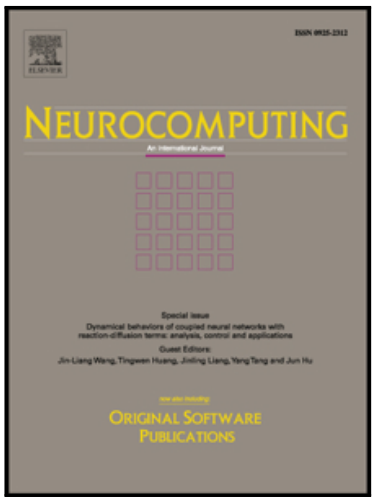

Encrypted Domain Matching of Fingerprint Minutia Cylinder-Code (MCC) with l_1 Minimization

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Encrypted Domain Matching of Fingerprint Minutia Cylinder-Code (MCC) with l_1 Minimization

Eryun Liu and Qijun Zhao

Abstract

Fingerprint is a highly discriminative biometric modality and has gained a lot of interests in both forensic and civil applications. However, it is well known that fingerprint template stored in plaintext is vulnerable to attack. A secure fingerprint template has to be both non-invertible and non-linkable. Minutia cylinder-code (MCC) is a fixed-length and highly discriminative type of minutia descriptor. However, most of the current MCC based fingerprint matching algorithms do not possess the non-linkable property. In this paper, a secured fingerprint MCC matching scheme is proposed by utilizing l_1-minimization, where the enrolled fingerprint MCC template is stored in cyphertext form (i.e., E-MCC) and is recognizable only when a close enough query fingerprint presented to the system. Our experimental results on FVC2002 DB1, FVC2002 DB2 and FVC2004 DB1 databases show that the proposed system is highly secure and accurate. The GAR with $\mathrm{FAR} = 0$ on FVC2002 DB1, FVC2002 DB2 and FVC2004 DB1 are 91.4%, 84.0% and 65.6%, respectively, with a security level of 33 bits. The performance of the proposed encrypted domain matching algorithm outperforms state-of-the-art fingerprint encryption algorithms.

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