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Fingerprint image cryptography based on multiple chaotic systems

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Abstract

This paper presents a new multiple chaos-based biometric image cryptosystem for fingerprint security. This encryption algorithm is constructed with four chaotic systems, which consist of two 1-D and two high-dimensional 3-D chaotic systems. This algorithm enhances the security strength of biometric image cryptography that incorporates single chaos and multiple 1-D chaotic systems. The advantage of the proposed scheme is that it possesses a secret key space large enough to empower the security strength to protect fingerprint image, which is enough to prevent any brute-force attacks. Furthermore, this algorithm has passed the NIST SP 800-22a tests and security analyses, which confirms that the proposed scheme is a secure cryptographic system.

Keywords: Fingerprint image encryption, Chaotic system, NIST SP 800-22a.

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