Abstract

In recent years, various DNA based cryptographic algorithms have been suggested to develop secure image encryption techniques but still many of them have low computing security as they have low avalanche effect and require to send long key. In this regard, this paper proposes a new method of image encryption based on DNA computation technology. The original image is encrypted using DNA computation and DNA complementary rule. First, a secret key is generated using a DNA sequence and modular arithmetic operations. Then each pixel value of the image undergoes the encryption process using the key and DNA computation methods. The researcher prove the validity of the algorithm through simulation and the theoretical analysis on the parameters such as sensitivity to plaintext, key sensitivity, histogram analysis, correlation analysis including bio-security and math security. Further, the algorithm has huge key space generated using key expansion algorithm while keeping the original key sequence small. It is shown the algorithm has achieved the satisfactory computing security level in the encryption security estimating system.
A New Image Encryption Algorithm based on DNA Approach

- Guangzhao Cui #1, Limin Qin #2, Yanfeng Wang #3, Xuncai Zhang, "An Encryption Scheme Using DNA Technology", 2008 IEEE.

Index Terms

Computer Science
Image Processing

Keywords
DNA sequence; key generation; encryption; DNA addition; DNA complementary rule