Improved 2-Level Data Security Approach using DNA Cryptography

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Abstract

Cryptography is the process of transforming the meaning of information with the aid of an encryption key. DNA cryptography is a new rapidly evolving technology that uses DNA computing principles: Adenine (A), Guanine (G), Cytosine (C), and Thymine (T) to encrypt or hide the meaning of information such that only the intended recipient can understand. This research aims to improve on a two level text data encryption system using DNA cryptography. To achieve the research goal, 2-level data security algorithms for encryption, decryption, and key generation were designed using Shift Cipher encryption technique at the first security level and One Time Pad encryption technique at the second security level of the encryption and decryption algorithms. The algorithms were implemented using the PHP programming language. The research findings revealed that the improved 2-level data security approach has better encryption and decryption execution time compared to the 2-level Text Data encryption using DNA cryptography and the encryption algorithms can be used to encrypt and decrypt alphanumeric and special symbol information.

Keywords: Cryptography, DNA Cryptography, 2-level data security approach, DNA One Time Pad.