Cryptography and Steganography are the two popular methods available to provide security. The former distorts the message and the latter itself hides the existence of the message. Using cryptography, the data is transformed into some other gibberish form and then the encrypted data is transmitted. In steganography, the data is embedded in an image file and the image file is transmitted. In the present, DNA has been widely used in cryptography and steganography. DNA Cryptography can be defined as a hiding data in terms of DNA Sequence. In this research endeavor we will present a new technique for DNA Cryptography and DNA Steganography.

Introduction

Cryptography, the study of concealing and safely transferring messages form recipient to sender, has been around since the time in which the classical human civilizations took shape. Cryptoanalysis is the study of dissecting and implementing cryptographic elements for the purpose of cracking cryptographic algorithms. DNA cryptography arose through implementing DNA patterns for the purpose of developing encrypted transmissions [2]. The DNA insertion method possesses the most protections against cryptoanalysis, making the DNA complementary and substitution methods less viable for DNA encryption [1].

Materials and Methods

The implementation of this project is based on M. P. M. M. R. V. Raghavan and V. R E.'s suggested implementation DNA insertion for a tenable DNA encryption algorithm [1]. The DNA encryption Algorithm starts with a “[randomized] DNA sequence” [1] that will serve as the target for embedding the message, DNA, or Deoxyribonucleic acid, itself is constituted of six molecular structures: “deoxyribose, a phosphate molecule, and four... nitrogenous bases,” [1] or nucleic acids, guanine, cytosine, adenine and thymine. The message must be transformed along with the key to start the initial encryption into the ASCII counterparts of letters, numbers and special characters, then transforming the ASCII counterparts to their binary counterparts [1]. The first character in binary message must be XORed with the binary value of the key, with the result of that operation being XORed with the next character[1]. This operation perpetuates until each character of the message has been encrypted [1]. The initial DNA that will be used to embed the message is transformed into its binary counterpart by the substituting each nucleic acid with its respective binary value [1].

A second key value determines the length of DNA segments to divide the DNA into [1]. Each bit of the original message is appended to the start of each separated segment of DNA [1]. The segments are then appended together as one complete string of DNA [1]. To finish the encryption, transform the binary counterparts of the DNA back to their nucleic acid counterparts [1].

DNA Steganography

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Abstract

Cryptography and Steganography are the two popular methods available to provide security. The former distorts the message and the latter itself hides the existence of the message. Using cryptography, the data is transformed into some other gibberish form and then the encrypted data is transmitted. In steganography, the data is embedded in an image file and the image file is transmitted. In the present, DNA has been widely used in cryptography and steganography. DNA Cryptography can be defined as a hiding data in terms of DNA Sequence. In this research endeavor we will present a new technique for DNA Cryptography and DNA Steganography.

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