

# Study on DNA Cryptosystems

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**Abstract**—Now a days the huge amount of data is stored in the cloud environment for ease of use. Those data need to be maintained in an efficient manner. To secure the data from unauthorized users such as attackers, hackers and to ensure privacy, integrity, confidentiality and availability of data, we can go with DNA cryptography. It is one of the emerging technique in cryptographical system. By using this technique the data is being encrypted and decrypted during the data transmission. Encryption and decryption of data is done by using various keys. In this paper, a new algorithm is proposed using DNA structure for the purpose of security in cloud environment.

**Keywords**—component; formatting; style; styling; insert (key words)

## I. INTRODUCTION (HEADING 1)

The usage of data in an organization is increases day by day. Those data is stored in cloud environment and retrieved from the cloud storage. It is possible to hack the data in the cloud storage. While storing and retrieving the data from the cloud, it needs to be secured and maintained from the unauthorized users in the cloud environment. For that there are many algorithms are available in the field of cryptographic network system.

Cryptography is the art and science to achieve the security of data in cloud system. It plays a major role in the network system. It makes the data unreadable during the transmission by using encryption and decryption mechanism.

### Encryption:

Encryption is the process of encoding the plaintext to cipher text using the secret keys. In an encryption the intended data is considered as the plain text is encrypted using an encryption algorithm and generates the cipher text that only read if it is decrypted.

### Decryption:

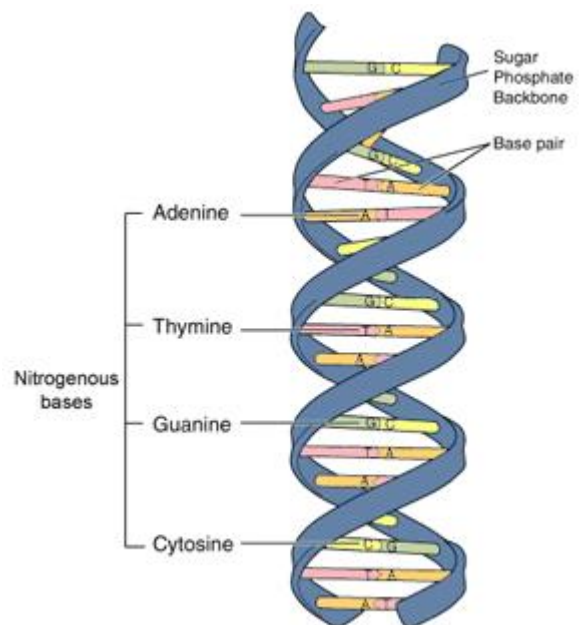
Decryption is the process of decoding the cipher text to plaintext using the key. It is possible to decrypt the data without the knowledge of the key, but for well-defined encryption algorithm, large computational resources and skills are required. An authorized receiver can decrypt the data with the key provided by the sender to receiver but not to unauthorized users.

### Key:

In cryptography, a key is a piece of information that determines the functional output of a cryptographic algorithm. The key is used to convert the plaintext to cipher text in an encryption and to convert the cipher text to plain text in decryption algorithm.

### DNA Cryptography:

DNA cryptography is one of the methodologies in cryptographical system. It is a new technique to hide the data from the unauthorized users using DNA. DNA has huge computing power, enormous parallelism and massive storage capacity. DNA cryptography is a technique to encrypt and decrypt the data using DNA sequence.



Basic DNA Structure

## II. RELATED WORK

### **Secure Data communication and Cryptography based on DNA based Message Encoding**

A Symmetric key generation scheme is proposed to secure the plain text by generating a primary cipher. Again a primary cipher is generated using DNA sequences. By this reading of plain text is more complicated. In this paper, Instructional strategy implemented. This approach is to increase the complexity level of cipher text during data transmission. It is achieved by using the encryption algorithm and Level-1 Private key methods. They measured file size, cipher size and time of encryption, decryption by using algorithms. The result of this paper is to complex the cipher text using two strong keys. Although it is powerful and efficient for certain attacks.

### **DNA Cryptography**

The objective of this paper is to minimize the time complexity using DNA hybridization, one time pad scheme and DNA molecular structure. This paper is related to theoretical framework. The instructional strategy implemented to minimize the time complexity during the communication and transmission of data. The time complexity reduction is achieved by the following methods such as Key generation, Encryption, Decryption. It gives a better solution for implementation in secure network.

### **Data Security And Cryptography Based On DNA Sequencing**

It introduces a new algorithm using DNA sequence for more secure and reliable data transmission. This paper is related to development exercise. Instructional strategy is implemented to secure the data while transmission. In this paper, security is achieved by two techniques such as Key generation, Encryption, Decryption. There are various factors are measured by using the algorithms. The result of this paper gives, more reliable, efficient of data. And it also provides more powerful against certain attacks during the data transmission over the network.

### **Secure Data Communication Using DNA based Cryptography in Mobile Adhoc Network**

The objective of this paper is to the provision of high level data security is done by using the unique cipher text generation procedures and new key generation procedures. Instructional strategy implemented to prevent the data while attacking during the data transmission in the mobile adhoc network. Attacking of data during transmission can be controlled by DNA based Digital Encoding. They measured all type file size by using chart, that represents the encrypted and decrypted time for certain file size. It is very efficient and powerful method for several attacks during the data transmission. It is stronger than the existing system.

### **DNA Based Cryptography**

The objective of this paper is to survey DNA cryptographic approaches and highlighting merits and demerits. This paper is based on the theoretical framework. The instructional strategy is implemented while communication and data transmission over the network. The result of this paper is to protect the data from the common brute force attacks that appears while data transmission. It gives the result as the analyze the advantages and disadvantage of various DNA cryptography algorithms.

### **DNA Cryptography Based on Symmetric Key Exchange**

The goal of this paper is to using symmetric key exchange, one time pad and DNA hybridization technique to minimize the time complexity. The instructional strategy is implemented to minimize the time complexity during the data transmission over the network. They measured time complexity for encryption and decryption by using algorithms. The output of this paper is to minimize the time complexity while transmitting the data.

### **A DNA-based Implementation of YAEA Encryption Algorithm**

This paper focus on introduce a new algorithm for secure the data from the several attacks while transmission of data. The instructional strategy is implemented to secure the data during data transmission. In this paper, the data security is achieved by YAEADNA algorithm. They measured average time in seconds and micro seconds based on the nuclides by chart that represents the time based on the file length. It gives the result as the DNA massive parallelism method can be much faster than the conventional methods.

### **DNA Security using Symmetric and Asymmetric Cryptography**

The objective of this paper is to analyze the alternative security method in varies technologies using symmetric and asymmetric keys. The instructional strategy is implemented to find the alternative security methods during the data transmission. The alternative security methods can be achieved by three classes such as security class, key generator class, cipher class In this paper, they measured several properties by using chart. The result of this paper is, While using asymmetric DNA mechanism that is more reliable and powerful than the other symmetric DNA algorithms.

### **Message Transmission Based on DNA Cryptography**

The objective of this paper is to study of DNA cryptography, DNA sequence, Data hiding and secure transmission. The instructional material is implemented to overview the DNA cryptography during the data transmission. By using table, they measured various factors. It uses various methods such as Bio Molecular Structure, OTP (One Time Pad), DNA chip technology , DNA

Fragmentations, Polymerase chain reaction (PCR) By surveying this paper, the list of tables can be made based on the existing work of DNA based cryptography.

### Secure communication using DNA cryptography with secure socket layer (SSL) protocol in wireless sensor networks

The objective of this paper is to propose a new algorithm that uses DNA cryptography to secure the data transmission channel. The instructional strategy is implemented while communication and data transmission. In this paper, the DNA concept for encryption with SSL protocol is used, which gives us three levels of security in WSN.

Author	Title	Objective	Solution	Solution method	Result
Snehal Javheri, Rahul Kulkarni	Secure Data communication and Cryptography based on DNA based Message Encoding	A Symmetric key generation scheme is proposed to secure the plain text by generating a primary cipher. Again a primary cipher is generated using DNA sequences. By this reading of plain text is more complicated.	To increase the complexity level of cipher text.	encryption algorithm and Level-1 Private key	To complex the cipher text using two strong keys. Although it is powerful and efficient for certain attacks.
Sabari Pramanik, Sanjit Kumar Setua	DNA Cryptography	To minimize the time complexity using DNA hybridization, one time pad scheme and DNA molecular structure.	To minimize the time complexity.	Key generation, Encryption, Decryption	It gives a better solution for implementation in secure network.
Nirmalya Kar, Atanu Majumder, Ashim Saha, Suman Deb	Data Security And Cryptography Based On DNA Sequencing	To introduce a new algorithm using DNA sequence for more secure and reliable data transmission.	To secure the data while transmission.	Session key generation and sharing, Key sharing	It provides more powerful against certain attacks during the data transmission over the network.

Snehal Javheri, Rahul Kulkarni	Secure Data Communication Using DNA based Cryptography in Mobile Adhoc Network	The provision of high level data security is done by using the unique cipher text generation procedures and new key generation procedures.	To prevent the data while attacking	DNA based Digital Encoding	Better and faster than conventional cryptography like DES and other DNA based encryption algorithm.
Ashish Kumar Kaundal and A.K Verma	DNA Based Cryptography	Surveying DNA cryptographic approaches and highlighting merits and demerits.	Analyze the advantage and disadvantages of existing system	Nil	To protect the data from common brute force attack
Abhishek Kumar, Sanchita Paul, Tausif Anwar	DNA Cryptography Based on Symmetric Key Exchange	Using Symmetric key exchange, one time pad and DNA hybridization technique to minimize the time complexity.	To minimize the time complexity.		To minimize the time complexity while transmitting the data.
Sherif T. Amin, Magdy Saeb, Salah El-Gindi	A DNA-based Implementation of YAEA Encryption Algorithm	To introduce a new algorithm for secure the data from the several attacks.	To secure the data	YAEADNA algorithm	The DNA massive parallelism method can be much faster than the conventional methods.
Radu Terec, Mircea-Florin Vaida, Lenuta Alboaie, Ligia Chiorean	DNA Security using Symmetric and Asymmetric Cryptography	To analyze the alternative security method in varies technologies using symmetric and asymmetric keys.	To find the alternative security methods.	The security class, The key generator class, The cipher class	While using asymmetric DNA mechanism that is more reliable and powerful than the other symmetric DNA algorithms.
Tausif Anwar,	Message	The Study of DNA	The overview	Bio Molecular	To list the Existing

Dr. Sanchita Paul and Shailendra Kumar Singh	Transmission Based on DNA Cryptography	cryptography, DNA sequence, Data hiding and secure transmission	of the DNA cryptography.	Structure, OTP (One Time Pad), DNA chip technology, DNA Fragmentations, Polymerase chain reaction (PCR)	works based on DNA cryptography.
Monikaa, Shuchita Upadhya yaa	Secure communication using DNA cryptography with secure socket layer (SSL) protocol in wireless sensor networks	To propose a new algorithm that uses DNA cryptography to secure the data transmission channel.			It provides security in WSN.

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