

# CONTENTS

	<b>Page No.</b>
List of tables	vii
List of figures	ix
List of abbreviations	xiv
List of definitions	xv
Abstract	xvi
<b>Chapter 1</b> INTRODUCTION OF COMPRESSION AND ENCRYPTION TECHNIQUE	
1.1 Introduction	1
1.2 Motivation	4
1.3 Back ground of proposed research work	5
1.4 Problem domain	5
1.5 Problem solving as a search task	7
1.6 Proposed work & methodology	7
1.7 Data flow diagram of DNA sequence compression & encryption	8
1.8 Proposed research approach	11
1.9 The selective algorithm improves on the standard approach	11
1.10 Thesis contribution	12
1.10 Thesis outline	12
<b>Chapter 2</b> THEORETICAL BACKGROUND AND LITERATURE REVIEW OF COMPRESSION & ENCRYPTION TECHNIQUES	
2.1 PRELIMINARIES OVERVIEW	
2.1.1 File format of DNA sequences	14
2.1.2 DNA sequence substring formation process	14
2.1.3 Mathematical formulation	14
2.1.4 Algorithm evaluation	15
2.1.5 Working principal	16
2.1.6 Hardware and software specification	16
2.1.7 Evaluation parameter	16
2.1.8 Decompression technique in client side	19
2.2 THEORETICAL BACKGROUND	
2.2.1 Introduction of Genomics	20
2.2.2 Growth of DNA sequencing	21
2.2.3 What is DNA	21

	<b>Page No.</b>	
2.2.4	History of DNA	21
2.2.5	Properties of DNA	21
2.2.6	Define compression	22
2.2.7	Text- vs DNA compression	22
2.2.8	Information Theory: Biological Information	22
2.2.9	Entropy coding in Genomic Sequences	22
2.2.10	Pattern discovery	23
2.2.11	Data Set	23
2.2.12	Defining repetition	23
2.2.13	DNA repetition in Biological classes	24
2.2.14	String matching	24
2.2.15	Exact repeat string searches	24
2.2.16	String compression	24
<b>2.3</b>	<b>LITERATURE REVIEW OF EARLIER WORK ON COMPRESSION</b>	
2.3.1	Encoding based on entropy	25
2.3.2	Dictionary based encoding	25
2.3.3	Substitution Based Methods	26
2.3.4	Substitution and Statistical Based Methods	26
2.3.5	Compressed Pattern Matching	26
<b>2.4</b>	<b>LITERATURE REVIEW OF EARLIER WORK ON ENCRYPTION</b>	
2.4.1	Historical Development of Ciphers	27
2.4.2	Data Encryption Standard (DES)	27
2.4.3	AES (Advanced Encryption Standard)	27
2.4.4	Asymmetric key encryption	27
2.4.4.1	Rivest, Shamir & Adelman	27
2.4.5	Public-Key Encryption	28
2.4.6	Digital Signature	28
<b>Chapter-3</b>	<b>DNA sequence compression using RP/GP<sup>2</sup> method with information storage and security</b>	
	Abstract	29
1	Introduction	29
2	Method	
2.1	Mathematical formulation	31
2.2	Procedure of reverse &palindrome or Genetic palindrome & Palindrome searching process	32

	<b>Page No.</b>
2.2.1 Searching of exact repetitions of sub string in Reverse & Palindrome or Genetic Palindrome & Palindrome	32
2.3 Time & space complexity	33
2.4 Process of compression	33
2.5 Encoding & Decoding Algorithm	34
3 Results & Discussion	36
4 Conclusion	46
<b>Chapter-4</b> DNA Sequences Compression using Repeat technique and Selective Encryption using modified Huffman's Technique	
Abstract	48
1 Introduction	48
2 Motivation and contribution	52
3 Methods	
3.1 Process diagram	52
3.2 File format	52
3.3 Formation of substring / word of different size	53
3.4 Merge Process	53
3.5 The Complexity of this techniques	54
3.5.1 Time complexity of Repeat algorithm	54
3.5.2 Space complexity of Repeat algorithm	54
3.5.3 Time complexity of Huffman algorithm	54
3.5.4 Space complexity of Huffman algorithm	54
3.6 Introduction of Repeat technique	55
3.7 Methodology of Repeat Technique	55
3.8 Searching procedure	55
3.9 Compression & decompression algorithm of Repeat technique	56
3.10 Methodology of experiments performed in modified Hoffman's technique	57
3.11 Encoding algorithm of modified Huffman's technique	62
4 Results and discussion	64
5 Conclusion	103
<b>Chapter-5</b> DNA Sequences Compression using GP <sup>2</sup> R and Selective Encryption using modified RSA Technique	
Abstract	106
1 Introduction	106
2 Existing Compression Algorithms	109

	<b>Page No.</b>
3 Existing Selection Encryption Algorithms	109
4 Motivation & contribution	110
5 Proposed technique of Genetic Palindrome, Palindrome and Reverse	
5.1 Methodology of GP <sup>2</sup> R technique	111
5.2 Searching process	111
5.3 Selective Encryption by using modified RSA technique	111
5.4 Compression ,decompression ,encryption & decryption algorithm	112
6 Results & discussion of Genetic Palindrome, Palindrome & Reverse technique	119
7 Conclusions	143
<b>Chapter 6</b> A Compression Algorithm for DNA Sequences Based on R <sup>2</sup> G Techniques with Security	
Abstract	145
1 Introduction	145
2 Proposed try-combination method of Repeat, Reverse & Genetic Palindrome technique	146
2.1 Method of Repeat, Reverse and Genetic Palindrome (R <sup>2</sup> GP) technique	146
2.2 Basic terminology of proposed try-combination of Repeat, Reverse & Genetic Palindrome technique	146
2.3 Encoding and decoding algorithm	147
3 Results and discussion of Repeat, Reverse and Genetic Palindrome technique	148
4 Conclusions	155
<b>Chapter-7</b>	
7.1 Conclusions	156
7.2 Application	158
7.3 Future Work	158
Summary	159
Bibliography	161