

## LIST OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	<b>List of Tables</b>	x
	<b>List of Figures</b>	xi
	<b>List of Abbreviations</b>	xii
	<b>List of Symbols</b>	xv
	<b>Abstract</b>	xvi
<b>1</b>	<b>INTRODUCTION</b>	1
1.1	WSN Architecture	1
1.2	Elements of a WSN Sensor Node	2
1.3	Importance of WSN	3
1.4	Applications of WSN	3
1.5	Challenges Faced by WSN	4
1.6	Energy Conservation	6
1.6.1	Need for Energy Conservation	6
1.7	Congestion in WSN	7
1.8	Congestion Types	10
1.9	Congestion Control in WSN	13
1.10	Classification of Congestion Control in WSN	19
1.10.1	Traffic-Based Congestion Control in WSN	19
1.10.2	Resource-based congestion control in WSN	20
1.10.3	Hybrid Congestion Control in WSN	21
1.11	Metrics Used for Congestion Detection	21
1.11.1	Energy Efficiency Analysis	21
1.11.2	Throughput	22
1.11.3	Average End-To-End Delay Analysis	23
1.12	Motivation of this Research Work	23
1.13	Research Gap	24
1.14	Problem Statement	24
1.15	Objective of the Thesis	24
1.16	Contribution of the Thesis	24

<b>CHAPTER NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
1.17	Organization of the Thesis	25
<b>2</b>	<b>LITERATURE SURVEY</b>	<b>26</b>
2.1	Introduction	26
2.2	Rate Control Scheme in WSN	26
	2.2.1 Rate based Congestion Control Techniques in WSN	27
	2.2.2 Merits and demerits based on rate control schemes in WSN	31
2.3	Congestion Control Schemes in WSN	34
	2.3.1 Merits and demerits of the Various Congestion Control Techniques Used in WSN.	36
2.4	Data Aggregation Method in WSN	37
	2.4.1 Merits and Demerits Based on the Data Aggregation Schemes	40
<b>3</b>	<b>PROFICIENT RATE CONTROL(PRC) ALGORITHM FOR CONGESTION CONTROL IN WSN</b>	<b>41</b>
3.1	Introduction	41
	3.1.1 Proficient Rate Control (PRC) By Using Virtual queue Techniques for Congestion Control in WSN	42
3.2	Priority Based Rate Control Schemes	42
3.3	Proposed Methodology	44
3.4	Experimental Setup	49
3.5	Performance Metrics	49
	3.5.1 Throughput	49
	3.5.2 Packet Loss	50
	3.5.3 End-to-end Delay	50
	3.5.4 Queue Size	50
	3.5.5 Data Transfer Rate	50
3.6	Performance Evaluation	50
	3.6.1 Throughput	50
	3.6.2 Packet Loss	51
	3.6.3 End-to-end Delay	52
	3.6.4 Queue Size	52

<b>CHAPTER NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
	3.6.5 Data Transfer Rate	53
<b>4</b>	<b>CONGESTION HANDLING USING PRC-FBA TECHNIQUES</b>	<b>55</b>
4.1	Introduction	55
4.2	Proficient Rate Control with Fair Bandwidth Allocation (PRC-FBA)	56
4.3	Fairness Bandwidth Allocation In WSN	57
4.4	Proposed Methodology	58
	4.4.1 Problem Formation for Energy Consumption	59
	4.4.2 Fair Bandwidth Distribution	62
4.5	Simulation Results	65
	4.5.1 Throughput	66
	4.5.2 Packet Loss	66
	4.5.3 End-to-End Delay	67
	4.5.4 Queue Size	67
	4.5.5 Data Transfer Rate	68
<b>5</b>	<b>PROFICIENT RATE CONTROL WITH DATA AGGREGATION AND FAIR BANDWIDTH ALLOCATION FOR WSN</b>	<b>70</b>
5.1	Introduction	70
5.2	Proficient Rate Control with Data Aggregation and Fair Bandwidth Allocation Algorithm (PRCDA-FBA) Using Random Linear Network Coding	77
5.3	Network Coding in WSN	72
5.4	Classification of Network Coding Approaches	76
5.5	Proposed Methodology	79
5.6	Simulation Results	86
	5.6.1 Throughput	86
	5.6.2 Packet Loss	86
	5.6.3 End-to-end Delay	87
	5.6.4 Queue Size	88
	5.6.5 Data Transfer Rate	88

<b>CHAPTER NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
<b>6</b>	<b>ENHANCED PROFICIENT RATE CONTROL DATA AGGREGATION- FAIR BANDWIDTH ALLOCATION ALGORITHM (EPRCDA-FBA)</b>	<b>90</b>
6.1	Introduction	90
6.2	Power Control Management in WSN	91
6.3	Proposed Methodology	94
6.4	Simulation Results	99
	6.4.1 Throughput	99
	6.4.2 Packet Loss	100
	6.4.3 End-To-End Delay	100
	6.4.4 Queue Size	101
	6.4.5 Data Transfer Rate	102
<b>7</b>	<b>CONCLUSION AND FUTURE WORK</b>	<b>103</b>
7.1	Conclusion	103
7.2	Future Work	106
	<b>REFERENCES</b>	<b>107</b>
	<b>PUBLICATIONS</b>	
	<b>PLAGIARISM REPORT</b>	