# TABLE OF CONTENTS

Abstract i

List of Figures viii

List of Tables x

CHAPTER 1 1

Introduction 1

1.1 The Benefits of Autonomic Computing 2

1.2 Thesis Motivation 4

1.3 Research gap 5

1.4 Thesis Statement and Objective 5

1.5 Contributions 6

1.6 Thesis Organization 8

CHAPTER 2 10

Background and literature survey 10

2.1 Major characteristics of Autonomic Computing 10

2.1.1 Self-Configuring 11

2.1.2 Self-Healing 12

2.1.3 Self-Optimizing 12

2.1.4 Self-Protecting 13

2.2 A brief history of Autonomic Computing projects 16

2.3 The Manage Analyze Plan Execute-Knowledge Loop 19

2.3.1 Concept of Utility 20

2.3.2 Reinforcement learning 21

2.4 Degrees of Autonomicity 21

2.4.1 Support 22

2.4.2 Core 22
2.4.3 Autonomous 22
2.4.4 Autonomic 23
2.5 Emerging application areas dominating Autonomic Computing 23
2.6 Summary 23

CHAPTER 3 25

Autonomic DBMSs 26

3.1 Autonomicity in Database Management Systems 26

3.1.1 Self-optimizing DBMS 28
3.1.2 Self-configuring DBMS 29
3.1.3 Self-healing DBMS 30
3.1.4 Self-protecting DBMS 31

3.2 The Components of Self-Optimization ADBMS 31

3.2.1 Query Optimization 31
3.2.2 Statistics Management 32
3.2.3 Automatic Monitoring & Intelligence 32
3.2.4 Parallelism 32

3.3 Analysis-what is missing in current DBMS? 33

3.4 What has been achieved so far? 34

3.5 Summary 36

CHAPTER 4 39

SQL Query Dissembler- A Self Optimizing Autonomic System 39

4.1 Introduction 39

4.2 Related concepts 41

4.2.1 Decomposition Algorithm 41
4.2.2 Assumptions and Dependencies 42
6.3 Experimental methodology 64
6.4 Results and interpretation 66
6.5 Snapshots 70
6.6 Summary 73

CHAPTER 7 74
Decision Tree Classifiers With Ga Based Feature Selection 74
7.1 Introduction 74
7.2. Related concepts 75
  7.2.1 Decision Trees 75
  7.2.2 ID3 Algorithm 77
  7.2.3 Genetic Algorithms 79
7.3 Experimental Methodology 80
7.4 Results and Interpretation 83
7.5 Sample Snapshots for water dataset 94
7.6 Summary 95

CHAPTER 8 97
Discussion, Conclusion and Future Work 97
References 101
Appendix-A 110
List of publication in National and International Journals 110
Appendix-B List of Abbreviations 112
Appendix-C TPC-H Benchmark 113