# TABLE OF CONTENTS

List of Abbreviations  i
List of Tables  ii
List of Figures  iii-iv
Abstract  v

1. INTRODUCTION  1-19
   1.1. Introduction  1
   1.2. Information Architecture (IA)  4
   1.3. Information Access  7
   1.4. Information Retrieval (IR)  8
   1.5. Genetic Algorithm (GA)  10
   1.6. Problem Statement and Research Motivation  11
   1.7. Objectives and Contributions of the Research  13
   1.8. Methodology Adopted  14
   1.9. Thesis Outline  17

2. REVIEW OF LITERATURE  20-45
   2.1. Introduction  20
   2.2. Prior Research in Information Access and Information Retrieval  21
      2.2.1. IR Models  24
      2.2.2. IR Techniques  28
      2.2.3. GA-based Strategies in Information Access and Retrieval  32
   2.3. Comparative Analysis of existing GA based studies in Information Retrieval  38
   2.4. Specifications Derived from Related Work  44

3. INFORMATION RETRIEVAL USING GENETIC ALGORITHM:
   IIARGA FOUNDATION  46-73
   3.1. Introduction  46
   3.2. Information Retrieval (IR) Process  47
      3.2.1. Document Representation  49
      3.2.2. Query Representation  52
3.2.3. Matching Process 52

3.3. Inverted Index 52

3.4. IR Evaluation 54

3.5. Genetic Algorithms in Information Retrieval 60
   3.5.1. Chromosome Representation 64
   3.5.2. Creation of Initial Population 65
   3.5.3. Fitness Function 66
   3.5.4. Selection Operator 68
   3.5.5. Crossover 70
   3.5.6. Mutation 71
   3.5.7. Termination Criteria 72

3.6. Summary 73

4. INFORMATION ARCHITECTURE FOR IIARGA IMPLEMENTATION 74-84
   4.1. Introduction 74
   4.2. Information Architecture 75
   4.3. Evolution of Information Architecture 76
   4.4. Components of Information Architecture 77
   4.5. IA Development Process 79
   4.6. Modeling Information Architecture of a Typical University: IARPU 82
   4.7. Summary 84

5. THE IMPROVED INFORMATION ACCESS AND RETRIEVAL THROUGH GENETIC ALGORITHM (IIARGA) 85-110
   5.1. Introduction 85
   5.2. IIARGA Framework 85
      5.2.1. Preprocessing Phase 88
      5.2.2. Evolutionary Phase 90
         5.2.2.1. Initial Population Creation 92
         5.2.2.2. Selection Operator 95
         5.2.2.3. Crossover 97
         5.2.2.4. Mutation 99
         5.2.2.5. Crossover and Mutation Rate 100
   5.2.3. Termination Criteria 102