# CONTENTS

Acknowledgement .......................................................................................................... i  
Abstract ........................................................................................................................... iii  
List of Publications ........................................................................................................ vii  
Table of Contents ........................................................................................................... ix  
List of Figures .................................................................................................................. xii  
List of Tables ................................................................................................................... xiii  
Abbreviations ................................................................................................................ xiv

## CHAPTER – 1: INTRODUCTION
1.1 Overview ..................................................................................................................... 1  
1.2. Definition of the Problem ......................................................................................... 2  
1.3 Aim and Objectives ................................................................................................... 4  
1.4 Scope of the Research Work ..................................................................................... 5  
1.5 Methodology ............................................................................................................ 6  
1.6 Chapter Organization .............................................................................................. 9  
1.7 Chapter Summary ................................................................................................... 9

## CHAPTER – 2: REVIEW OF LITERATURE
2.1 Introduction ............................................................................................................... 10  
2.2 Basic Concepts ......................................................................................................... 12  
2.2.1 Data mining: Concepts and Definitions ............................................................... 12  
2.2.1.1 Knowledge Discovery Process ...................................................................... 13  
2.2.1.2 Data Mining Classifiers .............................................................................. 15  
2.2.1.3 Sentiment Analysis / Opinion Mining ......................................................... 17  
2.2.2 Neural Network: Concept and Definitions ......................................................... 18  
2.2.2.1 Basic Terminologies .................................................................................... 18  
2.2.2.2 Learning Types in Neural Network ............................................................... 20  
2.2.2.3 Neural Network Classifiers ........................................................................ 21  
2.2.3 Genetic Optimization .......................................................................................... 21  
2.2.4 M-Learning ......................................................................................................... 23  
2.3 Literature Background ............................................................................................. 23  
2.3.1 Related works on Opinion mining ..................................................................... 24  
2.3.2 Relevance of M-Learning ................................................................................... 28  
2.3.3 Related Works of Data Preprocessing ............................................................... 32  
2.3.4 Related Works on Enhancing the Classification Accuracy ............................... 35  
2.3.5 Related Works on Neural Classifiers ............................................................... 38  
2.3.6 Related Works on Genetic Optimization of Classifiers ................................... 41  
2.4 Motivation of the Research ..................................................................................... 44  
2.5 Chapter Summary .................................................................................................. 44
CHAPTER – 3: A PREPROCESSING ALGORITHM TO IMPROVE THE CLASSIFICATION ACCURACY

3.1 Introduction .............................................................. 46
3.2 Background .................................................................. 48
3.3 Objectives .................................................................. 50
3.4 Existing Preprocessing Methods ................................. 50
  3.4.1 Stop Word Removal .................................................. 51
  3.4.2 Stemming ................................................................ 51
  3.4.3 Document Indexing .................................................. 52
  3.4.4 Singular Value Decomposition (SVD) ....................... 52
  3.4.5 Inverse Document Frequency (IDF) ......................... 54
3.5 Contemporary Classifiers .............................................. 56
  3.5.1 Data Mining Classification Algorithms .................... 57
    3.5.1.1 Random Forest ..................................................... 57
    3.5.1.2 k-Nearest Neighbor (kNN) ................................. 58
    3.5.1.3 Naïve Bayes ....................................................... 59
  3.5.2 Neural Network Classification Algorithms ................ 60
    3.5.2.1 Learning Vector Quantization (LVQ) .................. 61
    3.5.2.2 Elman Neural Network ..................................... 63
    3.5.2.3 Feed Forward Neural Network .......................... 64
3.6 Dataset ......................................................................... 64
3.7 Methodology ................................................................. 65
  3.7.1 KN preprocessing Algorithm ................................... 67
3.8 Results and Findings ....................................................... 69
3.9 Chapter Summary .......................................................... 74

Chapter – 4: KINN ALGORITHM FOR IMPROVING CLASSIFICATION ACCURACY

4.1 Introduction .............................................................. 76
4.2 Motivation .................................................................. 77
4.3 Objectives .................................................................. 80
4.4 Neural Network Classification Algorithms .................... 80
  4.4.1 LVQ Algorithm ......................................................... 81
  4.4.2 Elman Algorithm ...................................................... 82
  4.4.3 FFNN Algorithm ....................................................... 84
4.5 Methodology ................................................................. 92
  4.5.1 Architecture of KINN Algorithm ............................... 92
4.6 Results and Discussions ................................................ 98
  4.6.1 Experimenting with M-Learning Corpus .................... 99
  4.6.2 Comparison with the Existing Algorithms ................. 100
4.7 Chapter Summary .......................................................... 102
Chapter – 5: GKINN ALGORITHM FOR OPINION MINING
5.1 Introduction ................................................................. 103
5.2 Motivation ................................................................. 104
5.3 Objectives ................................................................. 107
5.4 Genetic Optimization Techniques .................................... 107
  5.4.1 Cross-over ............................................................... 108
  5.4.2 Mutation ................................................................. 109
  5.4.3 Filtering ................................................................. 109
5.5 Methodology .............................................................. 109
  5.5.1 Architecture of GKINN Algorithm ............................ 110
  5.5.2 Algorithm of GKINN .............................................. 112
5.6 Results and Discussions ............................................... 116
  5.6.1 Experimenting with M-Learning Corpus ..................... 116
  5.6.2 Comparison with the Existing Algorithms .................... 117
5.7 Chapter Summary ....................................................... 119

Chapter – 6: OPINION ANALYSIS MODEL
6.1 Introduction ............................................................... 120
6.2 Objectives ............................................................... 120
6.3 Research Explorations ............................................... 121
6.4 Architecture of Opinion Analysis Model ......................... 123
6.5 Chapter Summary ....................................................... 125

Chapter – 7: CONCLUSION AND FUTURE SCOPE
7.1 Overview ................................................................. 126
7.2 Prominent Interventions of the Research ....................... 127
  7.2.1 KN Preprocessing .................................................... 127
  7.2.2 KINN - A Neural Network Algorithm ...................... 128
  7.2.3 GKINN - A Genetic Optimized Algorithm .................. 128
  7.2.4 Opinion Analysis Model ........................................... 129
7.3 Limitations of the Research ........................................ 129
7.4 Applications of the Research ........................................ 130
7.5 Future Directions ..................................................... 130
REFERENCES ................................................................. R 1
APPENDICES ................................................................. A 1
  A. User’s Opinions from market.android.com
  B. Simulation Results
  C. Sample Source Code
  D. Papers Published in the International Journals