

<b>Chapter</b>	<b>Contents</b>	<b>Page No</b>
<b>1</b>	<b>Introduction</b>	<b>1</b>
	1.1. Image Processing	1
	1.1.1 Purpose of Image Processing	2
	1.2. Types of Image Processing	2
	1.3. Methods in Image Processing	3
	1.3.1. Image Restoration	3
	1.3.2. Image Enhancement	3
	1.3.3. Image Analysis	3
	1.4. Image Types	4
	1.4.1. Digital Image File Types	5
	1.5. Applications	7
	1.6. Image Steganography	9
	1.7. Edge Detection	10
	1.8. Neural Networks and Fuzzy Logic	12
	1.9. Application of Fuzzy Logic Based Edge Detection	14
	1.10. Motivation	15
	1.11. Problem Specification	15
	1.12. Objectives of the Research	15
	1.13. Contribution of the Research	16
	1.14. Scope and Applicability	16
	1.15. Organization of Thesis	17
	1.16. Summary	17
<b>2</b>	<b>Literature Survey</b>	<b>18</b>
	2.1. Literature Survey on Digital Image Stegnagraphy	20

2.2. Edge Detection Techniques	21
2.2.1 First Order based Edge Detection or Gradient based Edge Detection	27
2.2.2 Second Order Edge Detector	29
2.2.3 Cellular Automata Theory	29
2.2.4 Sobel and Canny with Swarm Intelligence based Ant Colony Optimization (ACO)	30
2.2.5 Fuzzy Logic Method	30
2.2.6 Edge Detection Algorithm for Corrupted Image	31
2.2.7 Neuro-fuzzy Inference System	32
2.3. Summary	32
<b>3 Improved Edge Detection Method by Using Weighted Support Vector Machines</b>	<b>33</b>
3.1. Existing Edge Detection Methods	34
3.1.1 Drawbacks	37
3.2. Proposed Methodology	37
3.2.1 Weighted Support Vector Machine	38
3.2.2 Weights Generating Algorithm	39
3.2.3 Methodology	41
3.2.4 Image Features	42
3.2.5 Classification and Detection	43
3.2.6 Advantages	44
3.3. Results and Discussion	45
3.3.1. Comparison Methods	45
3.4. Conclusion	48
<b>4 An Adaptive Bilateral Filter for Noise Removal and Novel Hybrid Fuzzy Cognitive Map-FNN Edge Detection Method</b>	<b>49</b>
4.1. Noise Models	49
4.1.1 Sources of Noise in Digital Images	50

4.1.2	Different Types of Noise	50
4.2.	Image De-noising	56
4.3.	Filtering Techniques	56
4.3.1	Linear Filters	57
4.3.2	Non Linear Filters	58
4.4.	Proposed Methodology	67
4.5.	Results and Discussion	76
4.5.1	Comparison of ABF and Bilateral Filter	77
4.5.2	Comparison of SVM, WSVM and HFCM-FNN	79
4.6.	Summary	83
<b>5</b>	<b>Results and Discussion</b>	<b>84</b>
5.1.	Comparison Methodology	84
5.2.	Comparison of K-Means, SVM with WSVM	85
5.2.1	Evaluation Results	87
5.3.	Comparison of Existing and Adaptive Bilateral Filter	88
5.3.1	Evaluation Results	90
5.4.	Comparison of SVM, WSVM with HFCM-FNN	91
5.4.1	Sensitivity & Specificity Comparison	92
5.4.2	Evaluation Results	94
5.5.	Summary	94
<b>6</b>	<b>Conclusion and Future Work</b>	<b>95</b>
6.1.	Conclusion	95
6.2.	Future Work	96
	<b>References</b>	<b>97</b>
	<b>Appendices</b>	