

Contents

List of Abbreviations	v
List of Common Symbols	vii
List of Notations	ix
List of Figures	xi
List of Tables	xv
List of Algorithms	xix
1 Introduction	1
1.1 Literature Review	7
1.2 Problem Domain	15
1.3 Motivations and Objectives of the Thesis	19
1.4 Contributions	21
1.5 Evaluation Metric	23
1.6 Organization of the Thesis	29
2 Steganographic Methodologies	33
2.1 Pixel Value Difference (PVD)	35
2.2 Weighted Matrix	36
2.3 Graph Neighbourhood	36
2.4 Discrete Cosine Transform (DCT)	37
2.5 Discrete Wavelet Transform (DWT)	40

I	Steganographic Scheme in Spatial Domain	43
3	Single Image Based Steganographic Scheme (SS)	45
3.1	SSGN	49
3.1.1	Data Embedding Procedure	49
3.1.2	Data Extraction Procedure	51
3.1.3	Experimental Results and Comparisons	53
3.1.3.1	Quality Measurement Analysis	53
3.1.3.2	Robustness Analysis	56
3.2	SSPVD	59
3.2.1	Data Embedding Procedure	59
3.2.2	Data Extraction Procedure	61
3.2.3	Experimental Results and Comparisons	63
3.2.3.1	Quality Measurement Analysis	63
3.2.3.2	Robustness Analysis	65
3.3	Analysis and Discussion	69
4	Dual Image Based Steganographic Scheme (DS)	71
4.1	DSGN	75
4.1.1	Data Embedding Procedure	75
4.1.2	Data Extraction Procedure	76
4.1.3	Experimental Results and Comparisons	77
4.1.3.1	Quality Measurement Analysis	77
4.1.3.2	Robustness Analysis	79
4.2	DSWM	85
4.2.1	Data Embedding Procedure	85
4.2.2	Data Extraction Procedure	91
4.2.3	Experimental Results and Comparisons	97
4.2.3.1	Quality Measurement Analysis	97
4.2.3.2	Robustness Analysis	100
4.3	Analysis and Discussion	107

II	Steganographic Scheme in Transform Domain	109
5	Steganographic Scheme based on DCT and DWT	111
5.1	SSDCT	115
5.1.1	Data Embedding Procedure	115
5.1.2	Data Extraction Procedure	118
5.1.3	Experimental Results and Comparisons	120
5.1.3.1	Quality Measurement Analysis	120
5.1.3.2	Robustness Analysis	123
5.2	SSDWT	127
5.2.1	Data Embedding Procedure	127
5.2.2	Data Extraction Procedure	130
5.2.3	Experimental Results and Comparisons	132
5.2.3.1	Quality Measurement Analysis	132
5.2.3.2	Robustness Analysis	134
5.3	Analysis and Discussion	137
6	Conclusion and Future Scope	139
6.1	Summary of the Proposed Works	141
6.2	Conclusion	146
6.3	Limitations	147
6.4	Future Scope	148
	Bibliography	151