

# List of Tables

2.1	Spatial Domain vs. Transform Domain watermarking Schemes. . . . .	11
2.2	Attacker’s goal against watermark for different applications. . . . .	15
3.1	Essential information observed during watermark embedding. . . . .	55
3.2	PSNR(dB) of restored content in the tampered area with different tampering rates. . . . .	56
3.3	Comparison of restoration capability among several fragile watermarking schemes. . . . .	59
4.1	Essential information observed during watermark embedding. . . . .	77
4.2	Essential information observed of recovered image after tampering by object addition attacks. . . . .	78
4.3	Essential information observed of recovered image after tampering by object removal attacks. . . . .	80
4.4	Essential information observed of recovered image after tampering by cropping attacks at 50% areas. . . . .	81
4.5	Essential information (PSNR (dB), NCC, Recovered time (Tr in Sec.)) of recovered content in the tampered areas with different tampering rates. . . . .	86
5.1	Essential information observed during watermark embedding. . . . .	108
5.2	PSNR(dB) of restored content in the tampered area with different tampering rates. . . . .	108
5.3	Essential information observed during watermark embedding. . . . .	108
5.4	Comparison of restoration capability using two cover images at 33% tampering rate ( $\gamma$ ). . . . .	115
6.1	Essential information observed during watermark embedding in Set 1 Images. . . . .	136
6.2	Essential information observed during watermark embedding in Set 2 images. . . . .	136
6.3	PSNR (dB), NCC, Recovered time (Tr in Sec.) of recovered content in the tampered areas with different tampering rates of gray scale images. . . . .	139

6.4	PSNR (dB), NCC, Recovered time (Tr in Sec.) of recovered content in the tampered areas with different tampering rates of color images.	140
7.1	SVD based watermarking schemes which are suffering from false positive detection problems.	149
7.2	Essential information observed during watermark embedding and extraction without attacks.	156
7.3	Comparison of Peak Signal to Noise ratio (in dB) for each host image.	156
7.4	Normalized Correlation Coefficient of Extracted Watermarks from Test Images	161
7.5	Comparisons of normalized correlation coefficient with existing Schemes: Liu & Tan, 2002 [97], Bhatnagar et al., 2012 [114], Ganic & Eskicioglu, 2005 [161], Gupta &Raval, 2012[168] and Lai & Tsai, 2010 [99]	166