Biometric Watermark Embedding in Document Images

by

Lam Ioi Tun, Victor

Master of Science in E-Commerce Technology

2009



Faculty of Science and Technology
University of Macau

TABLE OF CONTENTS

Abstract i
Table of Contents iii
List of figures v
List of TABLES vii
Acknowledgments viii
Chapter 1: INTRODUCTION 1
1.1 Motivation 1
1.2 Related WorkS 3
1.3 Research Approach 6
1.4 The structure of this Thesis 8
Chapter 2: BACKGROUND 9
2.1 Information hiding 9
2.1.1 What is Information hiding? 9
2.1.2 Objective of Information hiding 10
2.1.3 Development status of information hiding (history and catalog) 10
2.2 Digital Watermarking 13
2.2.1 Digital Watermarking Definition (Feature/Characteristic) 13
2.2.2 Digital Watermarking TechniqueS 14
Chapter 3: Digital Watermarking using Flipping, Discrete cosine transform and wavelet transform 20
3.1 Digital Watermarking using Flipping 20
3.1.1 Embed Fingerprint to Document Images using Flipping 20
3.1.2 Extract Fingerprint from Watermarked Document Images using Flipping 24
3.2 Digital Watermarking using Discrete Cosine Transform 26
3.2.1 Embed Fingerprint to Document Images using DCT 26
3.2.2 Extract fingerprint from watermarked Document Images using DCT 29

3.3 Digital Watermarking using Discrete Wavelet Transform 31
3.3.1 Embed Fingerprint to Document Images using DWT 31
3.3.2 Extract Fingerprint from watermarked Document Images using DWT 34
Chapter 4: Experimental results and discussions 36
4.1 Watermarking on Document Images by flipping method 37
4.1.1 embedding Watermark message into document images by flipping 37
4.1.2 Extracting embedded message from watermarked document images by flipping 44
4.1.3 Robustness against watermarked document images 44
4.2 watermarking on document images by DCT method 47
4.2.1 Embedding watermark message into document images by dct 49
4.2.2 Extracting embedded message from watermarked document images by dct 50
4.2.3 Robustness against watermarked document images 52
4.3 watermarking on document images by DWT method 55
4.3.1 Embedding watermark message into document images by dwt 55
4.3.2 Extracting embedded message from watermarked document images by dwt 58
4.3.3 Robustness against watermarked document images 60
Chapter 5: Conclusions and Future work 68
bibliography 72