

BINARIZATION AND IMAGE ENHANCEMENT OF
TRADITIONAL SONGKET MOTIFS IN TERENGGANU



INSTITUT PENYELIDIKAN, PEMBANGUNAN DAN
PENGKOMERSILAN (IRDC)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA

DISEDIAKAN OLEH
ZAINAB BT. ABU BAKAR
NURSURIATI BT. JAMIL
SULAIMAN BIN ABD GHANI
MAG 2004

PENGHARGAAN

Setinggi-tinggi penghargaan dan ribuan terima kasih diucapkan kepada semua pihak yang terlibat secara langsung dan tidak langsung bagi membolehkan penyelidikan ini disiapkan dengan sempurna.

Diantaranya:

Prof. Madya Khalil bin Haji Awang
Illyana Azni binti Safar
Wan Manang Songket
Terengganu Songket
Fatimah Besar Songket
Muzium Negeri Terengganu
Institut Kraftangan Malaysia, Rawang
Perbadanan Kemajuan Kraftangan Malaysia (Terengganu)
Perbadanan Kemajuan Kraftangan Malaysia (Kuala Lumpur)

TABLE OF CONTENTS

SURAT PENYERAHAN LAPORAN	II
KUMPULAN PENYELIDIK	III
PENGHARGAAN	IV
TABLE OF CONTENTS	V
LIST OF TABLES	VIII
LIST OF FIGURES	IX
ABSTRACT	XI
CHAPTER I	1
INTRODUCTION	1
1.1 OVERVIEW	1
1.2 OBJECTIVE OF THE PROJECT	2
1.3 SIGNIFICANT OF THE PROJECT	3
1.4 SCOPE OF THE PROJECT	3
1.5 SUMMARY	4
CHAPTER II	5
LITERATURE REVIEW	5
2.1 INTRODUCTION	5
2.2 IMAGE RESTORATION	6
2.2.1 Noise Reduction	7
2.2.1.1 Rank Order Filter	8
2.2.1.2 Mean Filter	9
2.2.1.3 Inverse Filter	10
2.2.1.4 Adaptive Wiener Filter	11
2.2.1.5 Spatial Domain Filtering vs. Frequency Domain Filtering	12

2.3	IMAGE ENHANCEMENT	13
2.3.1	Contrast Enhancement	13
2.3.1.1	Histogram Expansion	14
2.3.1.2	Histogram Equalization	16
2.3.1.3	Histogram Sliding	17
2.4	MORPHOLOGICAL OPERATIONS	18
2.4.1	Dilation	18
2.4.2	Erosion	19
2.4.3	Opening and Closing	20
2.4.4	Others	22
2.5	BINARIZATION	22
2.5.1	Global vs. Local Adaptive Techniques	23
2.5.2	Otsu's Thresholding Method	24
2.5.3	Entropy	24
2.5.4	Minimum Error Thresholding	25
2.6	SIMILAR ONGOING PROJECTS	26
2.7	SUMMARY	28
CHAPTER III		29
METHODOLOGY		29
3.1	INTRODUCTION	29
3.2	SONGKET PATTERNS/MOTIFS ACQUISITION	31
3.3	PREPROCESSING	32
3.4	CONTRAST ENHANCEMENT	34
3.5	NOISE REDUCTION	35
3.6	BINARIZATION	36
3.7	MORPHOLOGICAL PROCESSING	37
3.8	EVALUATION TECHNIQUE	38
3.9	SUMMARY	38

ABSTRACT

The beauty of songket, Malaysia's popular textile handicraft lies in the patterns and motifs inspired by its weavers and passed down through generations. The need to preserve this cultural heritage initiated this project that aims to create a collection of digitized traditional songket motifs. Data for this project are acquired through scanning or capturing photographs of songket patterns. The motifs are then extracted from the patterns, enhanced and filtered for noise removal, and converted to binary form. Finally, the motifs are subjected to morphological operations to restore the original motif shape. Twenty-five motifs are used in this project and the results show that for each motif, different techniques of filtering and morphological operations are needed to achieve the best-desired output. However, several recommendations are presented to guide users to accomplish the correct intended results. This report begins with an overview of the present situation and issues pertaining to the songket industry in Malaysia. The project objectives, scope and significance are then mentioned. Chapter II presents related literature reviews on image restoration, enhancement and binarization. Details of the methodologies are discussed in Chapter III and Chapter IV shows the experimentation results. Finally, Chapter V presents the findings, benefits achieved and recommendation for future work.