

TABLE OF CONTENTS

DECLARATION	II
DEDICATION	III
ACKNOWLEDGEMENTS	IV
ABSTRACT	V
المستخلص	VI
TABLE OF CONTENTS	VII
LIST OF TABLES	X
LIST OF FIGURES	XI
LIST OF ABBREVIATIONS	XII
LIST OF SYMBOLS	XIII
1. INTRODUCTION	
1.1 Preface	2
1.2 Problem Statement	3
1.3 Proposed Soluons.....	3
1.4 Aim and Objectives	3
1.5 Methodology.....	3
1.6 Thesis Outlines.....	4
2. LITERATURE REVIEW AND RELATEDWORK	
2.1 Background	6
2.1.1 Concept of image acquisition	6
2.1.2 Concept of image pre-processing	7
2.1.2.1 Concept of median filtering	7
2.1.2.2 Concept of image enhancement	8
2.1.3 Concept of image segmentation	8

2.1.3.1 Binary images: foreground and background	8
2.1.3.2 Concept of edge detection	9
2.1.4 Concept of feature extraction	10
2.1.5 Object recognition	10
2.1.5.1 Artificial neural networks (ANNs)	11
2.1.6 Malaria	13
2.1.7 Giemsa stain	15
2.1.8 Matlab environment	15
2.1.9 Digital image processing	16
2.2 Literature Review	18
2.2.1. Clinical diagnosis of malaria	18
2.2.2 Laboratory diagnosis of malaria.....	19
2.2.2.1 Conventional microscopy.....	19
2.2.2.2 QBC technique.....	20
2.2.2.3 Rapid diagnostic tests (RDTs)	21
2.2.2.4 Molecular diagnostic methods.....	22
2.2.3 Related Work	25

3. METHODOLOGY

3.1 Overview.....	30
3.2 The Process Model	31
3.2.1 Image acquisition	32
3.2.3 Image segmentation.....	33
3.2.3.1 Isolate RBCs from the background and edge detection	34
3.2.3.2 RBCs extraction.....	34
3.2.4 Feature extraction	35
3.2.4.1 Intensity features	36

3.2.4.2 Threshold features.....	38
3.2.5 Detection of plasmodium parasites	38
3.2.6 Database creation	38
3.2.7 Artificial neural network (ANN) classification.....	39
4. RESULTS AND DISCUSSION	
4.1 Introduction	41
4.2 Results of Image Pre-processing	41
4.3 Results of Image segmentation.....	42
4.3.1 Isolate RBCs from the background and edge detection	42
4.3.2 Results of RBCs extraction	43
4.4 Graphical user interface (GUI)	44
4.5 Results for Features Extraction	46
4.6 Results of image classification	46
4.6.1 Result for the developed algorithm	47
4.6.2 Artificial Neural Network (ANN) Results	47
4.6.3 Performance Evaluation of Classification	48
5. CONCLUSION AND RECOMMENDATIONS	
5.1 Conclusion	52
5.2 Recommendations	52
REFERENCES	53
APPENDICES	
APPENDIX A: MATLAB code	60
APPENDIX B: Figures for training neural network	84