

Universiti Teknologi MARA

RECOGNITION OF DIABETIC RETINOPATHY

FARRAH MURNI SYAMIRAH BINTI MOHD AFFIZAN

**Thesis Submitted in fulfilment of the requirements for Bachelor of
Computer Science (Hons.) Faculty of Computer and Mathematical
Sciences**

January 2020

SUPERVISOR APPROVAL

RECOGNITION OF DIABETIC RETINOPATHY

By

**FARRAH MURNI SYAMIRAH BINTI MOHD AFFIZAN
2017569625**

This thesis was prepared under the supervision of the project supervisor, Nur Nabilah binti Abu Mangshor. It was submitted to the Faculty of Computer and Mathematical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Computer Science.

Approved by

.....
Nur Nabilah binti Abu Mangshor
Project Supervisor

JANUARY 6, 2020

STUDENT DECLARATION

I certify that this thesis and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

.....
FARRAH MURNI SYAMIRAH BINTI MOHD AFFIZAN
2017569625

JANUARY 6, 2020

ABSTRACT

In this day and age, diabetic eye disease is a significant complication of diabetes mellitus which causing visual impairment and blindness. It is the main cause of loss of vision between individuals of working age and it has become a global concern. However, diabetes cannot be detected during physical treatment. Hence, to recognize the symptoms of the diabetic retinopathy, image processing techniques are applied. Images of the retina will be pre-processed first using the enhancement technique where Green Channel is applied. Next, segmentation of the image occurs using Morphology which is top-hat and bottom-hat. Features of the segmented image are extracted using Gray Level Co-Occurrence (GLCM) technique. These features are used as parameters during classification process. Accuracy result is calculated when Support Vector Machine (SVM) that is used for classification managed to recognize diabetic retinopathy. The accuracy of this system is 83.33% and it is developed using MATLAB software. The findings from this study is believed to be helpful as it may contribute in medical image processing field.

TABLE OF CONTENTS

CONTENT	PAGE
SUPERVISOR APPROVAL	ii
STUDENT DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	ix
LIST OF TABLES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER 1 : INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives	3
1.4 Scope	3
1.5 Significance	4
CHAPTER 2 : LITERATURE REVIEW	
2.1 Structure of Retina	5
2.2 Retina Problem	6
2.2.1 Macular Degeneration	6
2.2.2 Diabetic Retinopathy	7
2.2.3 Retinal Detachment	9
2.3 Category of Diabetic Retinopathy	10
2.3.1 Non-Proliferative Diabetic Retinopathy	10
2.3.2 Proliferative Diabetic Retinopathy	12
2.4 Diabetic Retinopathy Diagnosis Technique	13
2.4.1 Gaussian Filter	13
2.4.2 Gabor Wavelet	14
2.4.3 Wavelet Transform	16
2.4.4 Support Vector Machine	17
2.4.5 Naïve Bayes	19
2.4.6 Gray-Level Co-Occurrence Matrix (GLCM)	19
2.5 Comparison of Previous Related Works	20