

**UNIVERSITI TEKNOLOGI MARA
CAWANGAN PULAU PINANG**

**PLANT RECOGNITION BASED ON
IDENTIFICATION OF LEAF IMAGE
USING IMAGE PROCESSING**

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results if my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

It is a challenging task to analyze plant leaf images by a layman because there are very minute variations in some plant leaf images and the large data set for analysis. It is also quite difficult to develop an automated recognition system which could process a large amount of information and provide a correct estimation. In this paper, by using the database available on the internet and using Neural Network (NN) as the training algorithm, plant recognition based on leaf images would be developed. Image processing techniques are used to extract leaf features from the histogram of the leaf image. These extracted features are used as inputs to a neural network for classifying the plants. NNs such as Artificial Neural Network (ANN) and K-Nearest Neighbor (KNN) are trained in developing a classification system for agricultural purposes. ANN and KNN are applied to solve the problems in image analysis, pattern recognition, and classification. For the ANN, Multilayer feed-forward networks are trained using Back Propagation (BP) learning algorithm, and for the KNN, the most common distance, which is Euclidean, is used. The main objective is to develop a classification system for agricultural plants by image pre-processing, feature extraction, network training, and classification. Under the current research, 80 leaves from 4 kinds of plants were collected. Out of these, 40 leaves were used for training. The 40 leaves testing samples were recognized with 97.5% accuracy on ANN classification and 87.5% accuracy on KNN classification. The analysis and simulation of the classification of leaf images from different characteristics are tested and implemented in MATLAB.

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TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	AUTHOR'S DECLARATION	i
	ABSTRACT	ii
	ACKNOWLEDGEMENT	iii
	TABLE OF CONTENTS	iv
	LIST OF TABLES	vi
	LIST OF FIGURES	vii
	LIST OF SYMBOLS	viii
	LIST OF ABBREVIATIONS	ix
1	INTRODUCTION	1
	1.1 Background Of Study	1
	1.2 Problem Statement	3
	1.3 Objective	4
	1.4 Scope Of Work And Limitation	5
	1.5 Thesis Organization	5
2	LITERATURE REVIEW	7
	2.1 Literature	7
	2.2 Plant Recognition	8
	2.3 Methods in Proposal	10
	2.3.1 Image Pre-Processing	10
	2.3.2 Feature Extraction	12
	2.3.3 Training and Testing Data Processing	14
	2.3.4 Classification Using ANN	15
	2.3.5 Classification Using KNN	17

3	METHODOLOGY	19
	3.1 Project Flow Chart	19
	3.2 Project Block Diagram	20
	3.3 Database	22
	3.4 Image Pre-Processing	23
	3.4.1 Colour to Grayscale Conversion	24
	3.4.2 Binary Conversion	24
	3.4.3 Incomplement Image	25
	3.4.4 Filling Holes	26
	3.4.5 Multiplying	26
	3.5 Feature Extraction	27
	3.6 Classification Methods	29
	3.6.1 ANN	29
	3.6.2 KNN	30
4	RESULT AND DISCUSSION	31
	4.1 Result	31
	4.2 Classification using ANN	32
	4.3 Classification using KNN	39
5	CONCLUSION AND FUTURE RECOMMENDATION	40
	5.1 Conclusion	40
	5.2 Future Recommendation	41
	REFERENCES	42
	APPENDICES A-C	46