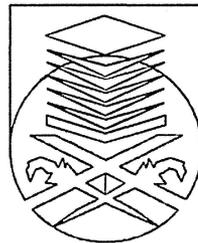


**RUBBER LEAF BLIGHT DISEASE DETECTION USING
MULTISPECTRAL SENSOR IN RURAL AND URBAN
AREA**

NUR ADRIANNA BINTI MAT ARIFFIN

2017830116



**Thesis submitted to the Universiti Teknologi MARA Malaysia
in partial fulfilment for the award of the degree of the
Bachelor of Surveying Science and Geomatics (Honours)**

JULY 2020

DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

In the event that my project/dissertation be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree of the Bachelor Surveying Science and Geomatics (Honours) and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

Name of Student : Nur Adrianna binti Mat Ariffin
Student's ID No : 2017830116
Project/Dissertation Title : Rubber Leaf Blight Disease Detection using
Multispectral Sensor in Rural and Urban Area
Signature and Date :

Approved by:

I certify that I have examined the student's work and found that they are in accordance with the rules and regulations of the Department and University and fulfils the requirements for the award of the degree of Bachelor Surveying Science and Geomatics (Honour's)

Name of Supervisor : Sr Nurhanisah binti Hashim
Signature and Date :

ABSTRACT

Agricultural productivity is the thing that Malaysia highly relies on economically. That is one of the reasons why plant disease identification plays an important role in the field of agriculture because it is basically to have a disease in plants. Detection of plant disease by using a spectroradiometer instrument is helpful because it decreases huge monitoring in huge crop farms and detects the signs of the disease means at very early stages as they occur on plant leaves. The technique used for spectroradiometer detection as well as classification of plant leaf diseases and surveys on different disease classification techniques that can be used for plant leaf disease detection. The specific objective is to identify the spectral signature characteristics of healthy (control) and “unhealthy” or stressed rubber trees due to leaf diseases as causal factors. The spectral reflectance of each infected rubber tree was separated according to the different wavelength and percent reflectance. The spectral signatures of rubber trees being attacked by diseases were characterized by a low reflectance probably due to the low chlorophyll content in the leaves leading to the tree under stress, thus easily separated from the healthy rubber. Results indicated that some groups of infected trees were well separated at the 530 - 650 nm (visible) wavelength reflectance. The spectral reflectance of rubber trees with leaf disease in visible (VIS) wavelength was not consistently separable. However, the spectral reflectance of leaf diseases can be well separated at the near-infrared range region covering from 700 - 850 nm wavelength reflectance for leaf diseases, respectively. The study implies that leaf diseases for rubber trees can only be identified successfully at the NIR range of wavelength from 700 – 850 nm reflectance.

ACKNOWLEDGEMENTS

Alhamdulillah, I am very grateful to Allah S.W.T for his blessings which give me the strength and spirit that enables me to finish this thesis. I wish to express my sincere appreciation and thanks to my supervisor, Madam Sr Nurhanisah Binti Hashim for the patience, encouragement, guidance, critics, motivation, and friendship throughout this thesis study. I am very thankful to Dr Nur Nafisah Binti Khalid, which is my coordinator supervisor in UITM Shah Alam for the technical support and guidance during the dissertation class. Without their continued support and interest, this thesis would not have been the same as presented here.

I would like to thank Malaysian Space Agencies (MYSA) and PTAR for getting the imagery data for these studies. I would also like to thank anyone either directly or indirectly that has helped me with the indispensable technical support provided during the laboratory and field experiments. My thanks also go to all the staff of the Centre of Studies for Surveying Science and Geomatics, Faculty of Architecture, Planning and Surveying of UiTM Shah Alam, who has contributed in one way or other to my research and for all their kindness, guidance and help.

I would dedicate my special thanks and appreciation to my beloved parents, Mr Mat Ariffin Bin Yusof and Mrs Juriah Binti Yunus, and also to my lovely siblings for all the encouragement given and sacrifices made, which meant a lot to me. Last but not least, I would like to gratitude to my friends for their moral support, comments and help throughout the sweet and sour moment for this semester. May Allah S.W.T bless all of us.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	ABSTRACT	iii
	ACKNOWLEDGEMENTS	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	ix
	LIST OF TABLES	xiii
	LIST OF ABBREVIATIONS	xiv
1	INTRODUCTION	1
	1.1 Research background	1
	1.2 Problem statement	2
	1.3 Aim and objective of study	4
	1.4 Scope and limitation of study	4
	1.5 Methodology of study	7
2	LITERATURE REVIEW	8
	2.1 Introduction	8
	2.2 Rubber tree (<i>Hevea Brasiliensis</i>)	9
	2.2.1 The use of rubber tree	9
	2.2.2 Rubber leaf disease	10
	2.2.2.1 Powdery Mildew leaf diseases	11
	2.2.2.2 <i>Corynespera</i> leaf diseases	12
	2.2.2.3 <i>Colletotrichum</i> leaf diseases	13
	2.2.3 Detection of rubber leaf disease	14
	2.3 Remote sensing technology	16
	2.3.1 Satellite imagery	16
	2.3.1.1 Landsat image	16
	2.3.1.2 SPOT	17