

UNIVERSITI TEKNOLOGI MARA

**COMPARISON BETWEEN OBJECT
BASED CLASSIFICATION AND PIXEL
BASED CLASSIFICATION
TECHNIQUE TO DETECT
DEFORESTATION IN ULU MUDA
FOREST RESERVE, KEDAH**

SHHRUL NIZAM BIN JAMALUDIN

Thesis submitted in fulfilment of the requirements for the
degree of
**Bachelor in Surveying Science and Geomatics
(Honours)**

Faculty of Architecture, Planning and Surveying

JULY 2018

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of

Name of Student : Shahrul Nizam bin Jamaludin
Student I.D. No. : 2015208292
Programme : Bachelor of Surveying Science and Geomatics
(Hons) – AP 220
Faculty : Faculty of Architecture, Planning & Surveying
Thesis : Comparison between Object Based
Classification and Pixel Based Classification
Technique to Detect Deforestation in Ulu
Muda Forest Reserve, Kedah.

Signature of Student :

Date : July 2018

ABSTRACT

Remote sensing is moving toward mapping the Earth surface using the highly technology implement. The researcher has invented two types of classification that can be integrated with the modern technology. Those categories of classifications are pixel based classification and object based classification. Both methods purpose to analyse forest cover and changes especially deforestation activity but, due to the early stage of these methods, their abilities to classify land cover and monitor forest dynamics have not fully evaluated and investigate. Here, the strength for both methods was studied, to know which one is the best in detecting deforestation at Ulu Muda Forest Reserve, Kedah. The forest cover at Ulu Muda will be classified, where pixel based classification was done using the Erdas software while object based classification completed using the eCognition software. Satellite imagery from SPOT 5 and 6 with size pixel of 12 metre and 7 metre were used in change detection analysis. The accuracy assessment has been done to identify the overall accuracy for both classifications including the user and producer accuracy. The higher value of that accuracy approaching to 100, the more accurate the classification can be said. The possible best method of classification in detecting deforestation activity will be determined and explained more its concept in this study.

TABLE OF CONTENT

CONFIRMATION BY PANEL OF EXAMINERS	ii
SUPERVISOR DECLARATION	iii
AUTHOR'S DECLARATION	iii
ABSTRACT	viii
ABSTRAK	vi
ACKNOWLEDGEMENTS	vii
TABLE OF CONTENT	viii
LIST OF TABLES	xi
LIST OF FIGURES	xii
CHAPTER ONE: INTRODUCTION	1
1.1 Thesis Introduction	1
1.2 Research Background	2
1.3 Research Gap	3
1.4 Problem Statement	5
1.5 Aim	6
1.6 Objectives	6
1.7 Research Question	6
1.8 Significance Study	7
CHAPTER TWO: LITERATURE REVIEW	8
2.1 Introduction	8
2.2 Satellite Imagery	9
2.3 SPOT Image	11
2.3.1 Spot Orbit	12
2.3.2 Spot Satellite Band Designation	13
2.4 Digital Image	16
2.4.1 Digital Image Processing	17
2.4.2 Image Classification	18
2.4.3 Pixel Based Classification	19
2.4.4 Object Based Classification	22
2.5 Forestry	25
2.5.1 Forest	25
2.5.2 Deforestation	26

2.5.3	Factor Affecting The Deforestation	28
2.6	Remote Sensing In Determining Deforestation	29
CHAPTER THREE: METHODOLOGY		33
3.1	Introduction	33
3.2	General Concept	33
3.3	Study Area	34
3.4	Data Collection	35
3.4.1	SPOT Images	35
3.4.2	SPOT 5 And SPOT 7 Images	36
3.5	Research Methodology	37
3.6	Data Processing And Analysis	38
3.6.1	Image Registration	38
3.6.2	Image Subset	40
3.7	Pixel Based Classification	40
3.8	Object Based Classification	43
3.8.1	Segmentation	43
3.8.2	Classification Based on Object	44
3.9	Accuracy Assessment	44
CHAPTER FOUR: RESULT AND ANALYSIS		46
4.1	Introduction	46
4.2	Satellite Image Processing Result	46
4.3	Result Pixel Based Classification	50
4.4	Result Object Based Classification	52
4.5	Overall Accuracy	54
4.6	Area Coverage For Every Classes	58
4.6.1	Area Of Classes for Year 2006	58
4.6.2	Area Of Classes for Year 2016	58
4.6.3	Area Comparison for Year 2006 And 2016	59
4.7	Ulu Muda Changes Using Image Fusion	62