DEVELOP AN OIL PALM HARVESTING PLAN

R.M.S.S. Herath 179463G

Faculty of Information Technology
University of Moratuwa
July 2021

DEVELOP AN OIL PALM HARVESTING PLAN

R.M.S.S. Herath 179463G

Dissertation submitted to the Faculty of Information Technology, University of Moratuwa, Sri Lanka for the fulfillment of the requirements of Degree of Master of Science in Information Technology.

July 2021

Declaration				
We declare that this is our own work and has not been submitted to another degree or				
diploma at a university or other higher education institution. Information obtained				
from published or unpublished work by third parties is acknowledged in the text and a				
list of references is provided.				
Name of Student	Signature of Student			
R.M.S.S Herath				
	Date:			
Supervised by				
Name of Supervisor	Signature of Supervisor			
Mr.Saminda Premarathna				
	Date:			

					4
Acl	งทก	wie	dge	me	nts

First of all, I would like to thank Mr. Saminda Premarathna, a lecturer at the Faculty of Information Technology at Moratuwa University, for his valuable time in teaching, monitoring, consulting and research projects.

In addition, I would be glad to thank Dr. Mohamed Fildos for teaching me research methodology and literature review, as well as my thesis in which the subject was written on which this study was based.

Thanks also to all the colleagues in IT degree program and my office staffs who gave us valuable comments in order to improve the results of our research throughout my life, especially the support that I provided.

Contents

Abstract	iv
1. Introduction	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Research Questions	3
1.4 Aim and Objectives of the study	3
1.4.1 Aim	3
1.4.2 Objectives	3
1.5 Scope of the study	4
1.6 Proposed solution	4
CHAPTER II	5
2. Literature Review	5
2.1 Oil palm harvesting in Sri Lanka	5
2.2 Image Processing	7
2.3 Image Processing in Harvesting Fruits and Vegetables	9
2.4 Image Pre-Processing	10
CHAPTER III	16
3. Technology Adapted	16
3.1 Introduction	16
3.2 Python.NET	16
3.3 SQLite	17
3.4 Tensor flow	17
3.5 Android	17
3.6 HTML, PHP	18
3.7 Google core lab	18
CHAPTER IV	19
4. My Approach	19
4.1 Introduction	19
4.2 Hypothesis	19
4.3 Data Modeling	19
4.4 Input	
4.5 Attribute selection	20
4.7 Input through GUI	22
4.8 Output	22
4.9 Process	22
4.10 Users	22

4.11 Features
CHAPTER V
5. Data analysis and Design
5.1 Image classification
5.2.1 Creation of data set
5.2.2 Dataset
5.2.4 Creation of the model
5.2.5 Compile the model
5.2.6 Training and visualize the data27
5.2.7 Evaluation the model
5.2.8 Data prediction
5.2.10 Integration with data base
CHAPTER VI
6. Implementation
6.1 Numbering the trees by Using QR Code
6.2 Taking images by using android application
6.3 Sync images to web drive
6.4 Processing images. 33
6.5 Sync produced data file with local PC
6.4 Displaying the harvesting plan
CHAPTER VII
7. Conclusion
7.1 Limitations
7.2 Further works
References

List for Figures	Page No
Figure 1: Maturity stages of oil palm bunch	21
Figure 2 : Flow chart for interface design	23
Figure 3: Data set and categorical classes.	25
Figure 4: Standardizing the data set	26
Figure 5: Sequential Model	26
Figure 6: Sequential Model summary	26
Figure 7: Compilation of the model	27
Figure 8: Training the model	27
Figure 13: Data base integration	31
Figure 14: Implementation chart	32
Figure 15: GUI's of image collection application	33
Figure 16: Dash board	34
List for Tables	Page No
Table 01: Relationship among output and maturity stage	30

Abstract

Fruit harvesting techniques that are both safe and quick are becoming more popular in the agricultural sector. Traditional grading systems are still widely employed today, despite the advancement of technology. However, high prices and certain discrepancies force the post-harvesting sector to use automation in categorization activities due to the high expenses.

Recently, businesses have begun to turn to automation technologies in order to increase working capacity while simultaneously lowering operating expenses. When automated grading methods are utilized, the inconsistencies that are connected with hand grading are reduced. As a result, the mistake rate and expenses are reduced, while the speed is increased. As is well known, the size, shape, color, and tissue of the object are the fundamental factors in the categorization process. An investigation into automated color grading of oil palm utilizing digital cameras and computerized image processing methods was conducted in this research. The constructed system has accomplished the most fundamental duties, but it still needs additional development.