Automated Rubber Seed Clones Identification Using Imaging Technique and Statistical Analysis

MUHAMMAD FAHMI BIN HARUN
2009693168
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR, MALAYSIA

ACKNOWLEDGMENT

All praises be to mighty Allah S.W.T., the Most Gracious, Most Merciful and Most Beneficent for giving me strength and blessing me throughout the entire research and completion of this project. Peace upon our Prophet Muhammad S.A.W. who has given light to mankind.

The author would like to acknowledge Mr Fairul Nazmie, project supervisor for his valuable advice, ideas and critical guidance throughout the preparation of this project. Also acknowledgement to Miss Nor Ezan for her support in sharing the knowledge in image processing has made this project successful. Not to forget, appreciation to Rubber Research Institute of Malaysia (RRIM) for sharing their knowledge and providing the data prior to the preparation of this project.

Not forget to all of my friends for spending so much time and ideas for me in order to finish this report. Although the ideas seem to be simple, but I can say that the simple ideas is very helpful.

Last but not least, the author also wants to thank to any parties who has contribute into this completion of the thesis. These contributions are really meaningful for me.

ABSTRACT

This paper describe research work to recognize selected rubber seed series clones using image processing techniques based on perimeter, area and radius. There are five types of rubber seed clone from the species *Hevea brasiliensis* of rubber seed have been used as samples in this project which are RRIM2002, RRIM2015, RRIM2020, RRIM2023 and RRIM2024. Sample of rubber tree seeds are captured using digital camera where the RGB color image are stored and processed. Processing involves segmentation algorithm which includes thresholding and application of morphological technique to extract the shape features. Another 225 samples are used for testing and the analysis is done using SPSS software to identify the clones correctly. From the observed one-way ANOVA and error plot measurement, it shown that all of clones series significantly different from each other for perimeter classification but only two series shows significantly different for area and radius classification. As a conclusion, perimeter of rubber seed clone can be used in order to recognize all selected best rubber tree clones compare with area and radius that can only be used for RRIM2002 and RRIM2015.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Rubber tree is an important plant in the world to supply the raw material for manufacturing. In order to increase the production from rubber tree i.e. latex and heveawood, the seeds planted must be from the quality of rubber tree. Therefore, seeds planted must be from the quality rubber tree series clones *e.g.* RRIM2000 series. There are about 33 types of clone within the RRIM2000 Series [1].

The fundamental of seed identification is by looking at the seeds and try to match its appearance to the closest appearance photo from a library text. Experienced workers will just look at the shape and texture pattern of the seeds in order to decide. However, both of these methods will consume time, percentage accuracy and as well as cost in order to trained new worker or farmer with regards to the identification of rubber seed clones. Since seeds presentation can also be presented in terms of digital images, therefore they can be processed and measured to produce important quantitative features information[2].

Therefore, this project proposed that the above selected features information to be used in designing an automated model for discriminating the best clone series. The ventral section of the rubber seed will utilize texture features extracted from the seed segmentation of the digital image.