

**AUTOMATED RUBBER SEED CLONES IDENTIFICATION USING
REFLECTANCE SENSOR WITH FPGA**

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ABSTRACT

Latex is one of many commodities that our country exports. To produce high quality latex, the rubber tree must be come from good clone seeds such as from clone RRIM2000 series. In order to identify those clones, rubber seed clone inspector will physically be analyzed by looking at its shape, colour and size. For an experienced rubber seed clone inspector is not a problem but to train new rubber seed clone inspector is consuming time and money. Every clone has distinct pattern and colour at their surface. By using reflectance sensor, the sensor can use those parameters to differentiate also can identify the type of clone. Analysis results were shown in terms of data and graph where the ADC values of each type of clone were different. Results of findings have sown evidence that the brightness of brown colour on the upper surface of the clone seed can be used to classify the types of rubber clones and using FPGA it can be automated to identify the types of rubber seed clone.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Rubber tree is an important plant to supply the raw material for industry application such as surgical glove, tire and others application. In order to increase the production from the rubber tree, i.e. latex and heveawood, the seeds planted must be from the quality of the rubber trees. 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].

This thesis focused the study on pattern and colour of rubber seed clones for recognition purpose. There were many differences of intensity of the brown colour and pattern features at seed's surface based on clone series. The rubber seed's inspector just looks at the surface of seeds to decide the type of clones. However, this method is time consuming, low percentage accuracy and as well as very high cost in order to trained new worker or farmer with regards to the identification of rubber seed clones from the rubber tree.

The development of this project begins with the understanding the features and different types of rubber seed clones. Each clone has different characteristics in terms of patterns,