

## **Detect Appropriate Period to Apply Fertilizer for the Tea Plantation Using Image Processing**

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Tea cultivation is one of the main income sources of the export field in Sri Lanka and the main sources of employment in the country, employing more than one million workers. Tea inflation is a national challenge. Tea revenue drops several times a year due to the low yield of tea and it is the main threat to the tea industry. The yields can be reduced due to the poor nutrition of the plant. Fertilizer should be applied to the plant on time to maintain the nutrition of the plant and can get a proper harvest. When the plants do not have fertilizer, the fibers in the leaves change, and gradually the color of the leaf change to yellow. Experts' eye observation is the ordinary method to recognize the time to fertilize. Especially, it is hard to recognize the exact period of the fertilizer application to tea plants by eye observation with the help of color changes on leaves for novel tea planters. Hence, they may require to grab the assistance of expertise, which is more expensive. Early recognition of the period of the fertilizer application is the key to avert losses in the quality and quantity of tea products. Therefore, an accurate, efficient automatic method for recognizing fertilizing period is a very useful tool for novel planters among tea cultivators. This research describes the automatic recognition of the period of fertilizer application for the 'TRI 4049' type of Tea plants using image processing technique. This can fill the gap of experts with cheap labor and computers. It is beneficial to get a nutritional harvest for a large estate. The developed application consists of four main steps namely image acquisition, image pre-processing, segmentation, and feature extraction and Classification. The green pixels percentage was calculated to find out the suitable period for the fertilizer application of the Tea plants. The accuracy of the system was found as above 73% after the train and validate the model. In the conclusion, the developed method can help novice planters to recognize the most suitable period of the fertilizer application for tea plants early and cheaply.

**Keywords:** Image Processing; Feature Extraction; Classification; Fertilizer Applications