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Betel leaf classification using image processing techniques

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The betel leaf is a commercial product, which is mostly chewed with areca nut, slaked lime, tobacco, and other substances. In Sri Lanka, over 10 wild betel varieties have been discovered and betel leaves are exporting as a minor export crop. Exported betel leaves should be in good quality and exporters usually verify varieties and quality of the leaves manually. Therefore it is a disadvantage for Sri Lankan exporting industry due to lack of knowledge about varieties of betel leaves and mistakes can be happened as a manual process. This research is mainly focused on classification of betel varieties using image processing techniques. The two main varieties named Getathodu and Mahamaneru and two subcategories call Kanda betels and Ran betels are considered for this classification process. 800 images of betel leaves are captured as training data set and 200 images of betel leaves are used as testing dataset. The captured images are preprocessed and segmented using image processing techniques. The unique features of leaves, shape and veins pattern are extracted as features to develop the classification model using convolutional neural network and the classification model is developed with accuracy of 57%. Finally the trained model is able to classify the above mentioned two main varieties and sub varieties of betel leaves successfully. The average testing accuracy of the classification model is around 81%. The developed model will be a great advantage for the exporters' market as well as anyone can obtain correct awareness about betel verities.

Keywords: Betel leaves, Feature extraction, Image Processing, Convolutional neural network

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