

Sago Palm Detection and its Maturity Identification Based on Improved Convolution Neural Network

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ABSTRACT

Sago palms are mainly cultivated in Sarawak, especially in the Mukah and Betong division, for consumption and export purposes. The starches produced from the sago are mostly for food products such as noodles, traditional food such as *tebaloi*, and animal feeds. Nowadays, the sago palm and its maturity detection are done manually, and it is crucial to ensure the productivity of starch. The existing detection methods are very laborious and time-consuming since the plantation areas are vast. The improved CNN model has been developed in this paper to detect the maturity of the sago palm. The detection is done by using drone photos based on the shape of the sago palm canopy. The model is developed by combining the architecture of three existing CNN models, AlexNet, Xception, and ResNet. The proposed model, CraunNet, gives 85.7% accuracy with 11 minutes of learning time based on five-fold-validation. Meanwhile, the training time of the CraunNet is almost two times faster than the existing models, ResNet and Xception. It shows that the computation cost in the CraunNet is much faster than the established model.

Keywords: Convolution neural network (CNN), deep learning, sago palm

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INTRODUCTION

Sago (*Metroxylon sagu*) is an excellent crop for sustainable agriculture, shown in Figure 1. It can grow in underutilised wetlands and peat bogs where other food crops cannot grow economically. It produces high-yield edible starch (about 150–300 kg dry starch per plant). Different parts of palm trees can be used as roofing materials, animal feed,