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ABSTRACT

Nowadays, one of the biggest challenge in front of fruit farmers is to the count number of fruits on the trees manually. During manual counting of fruit, quality of fruit may degrade because fruits move from one basket to another basket. The automated fruit sorting, detection and counting approach can help farmers to speed up time for processing and requires less labor. This work presents automatic classification of fruits by using deep neural network and machine-learning algorithms. Computer vision techniques are used for on tree fruit detection and counting. In deep neural network a new model has been proposed by using own dataset on which fine tuning operations performed on pre-trained VGG-16 model. In machine learning approach various supervised algorithms such as decision tree, K-nearest neighbor, logistic regression, linear discriminant analysis, support vector machine, gaussian naive bayes are used but amongst them K-nearest neighbor algorithm show better accuracy at K=5 because it predicts accurate result by considering labels of five nearest neighbors around test sample. Deep neural network classify fruits under shadow, occluded by foliage, branches and during overlap amongst fruits. Hence, deep neural network more accurately classify fruits as compare to machine learning approach. This project not only work for images but also for video sequences. This proposed system accurately classify, detect and count on tree fruit which will help the framers in robotic harvesting of fruits and in precision farming. The main objective of this work is to reduce input cost, minimize work time, improve fruit quality and increase the yield of fruits.

Keywords**:** Computer vision, image-processing, machine learning algorithms, deep convolution neural network.