

## ABSTRACT

In Agriculture, it would be beneficially helpful for the fruit farmers if they can monitor and estimate the yield before harvesting so they can optimize the number of materials required such as water consumption, fertilizers, and other agricultural chemical more efficiently for each different locations. This study proposed a method for detecting and counting mango fruit in occluded conditions by evaluating the colour filter and the local property of fruit that can be extracted such as the homogeneity of fruit surface. This study is an attempt to extend Nana's work [13] by focusing on the detecting and calculating the number of mangos in two major conditions, namely single fruit and clustered/occluded fruit. This study fully made use of the information extracted from the created blobs after conducting histogram filtering such as weighting, evaluating the blob gradient topographical and performing a hierarchical clustering. This method had a lower efficiency cost and did not need to determine the number of clusters to be searched. The function of this also improved by providing the information of the position and the number of fruits in the result images. This information can be used to evaluate the precision of the detection. The images used in this experiment were 150 mango images divided into 30 training images and 120 testing images. In the case of clear appearance of mango, experimental results show that mango detection rate, counting rate and false rate are up to: 97.53%, 99.28%, and 0.72%, respectively. By overall, the result of our study presented the total number of fruit detected by system of 646 images as True Positive conditions from the total of 705 fruits, with overall ratio of detection rate, counting rate, false rate: 91.63%; 97.88%, 2.12% respectively.

**Keywords:** mango detection, fruit occlusion, fruit detection, fruit counting, topographical distance, hierarchical clustering, histogram thresholding