

Chawaroj Jaisin 2014: Determining the Sizes of Fresh Longans in a Bunch by Image Processing Technique. Doctoral of Engineering (Agricultural Engineering), Major Field: Agricultural Engineering, Department of Agricultural Engineering. Thesis Advisor: Mr.Siwalak Pathaveerat. Ph.D. 132 pages.

An experimental sorting system was developed for bunches of longan fruits by using an image processing technique. Specifically, a machine-vision system was developed for determining the size and location of individual longans in the bunch. The experimental system involved the use of a camera with a charge coupled device to record images of longan fruits in bunches, which were subsequently converted into digital data using a TV card installed within a microcomputer. The analysis was performed with an image processing software which determined the size and location of each individual longan. The HSB (hue, saturation and brightness) colour model was adapted to the images of longan fruits in bunches, including branches and leaves, to separate the objects of interest from the background. The images of longans were further processed to eliminate noise and convert the images to gray scale while a Canny edge detector was operated as an image processing tool to detect edges in the images of longan fruits. Since the shape of longans is roughly circular, a circular Hough transform was also applied to the images in searching for longans.

The results show that the overall margin of error of the size determination using the developed image processing technique, as compared to actual sizes of longan fruits, was less than 10%. In addition, the aforementioned image technique could locate 90% of individual longans which were not overlapped and detect 79% of the overlapped longan fruit in the images.

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Student's signature

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Thesis Advisor's signature