Identifikasi Tingkat Kematangan Buah Pisang Menggunakan Algoritma *Fuzzy Logic* Dengan Ekstraksi Fitur RGB dan GLCM

Abstract

Research on detecting the ripeness level of fruit based on the characteristics of color and texture on the skin of the fruit has begun to be carried out as the need for fruit consumption increases and yields are inconsistent. As in previous research, the ripeness level of banana has been detected using a fuzzy logic algorithm by utilizing RGB values. However, the model sometimes still incorrectly predicts the ripeness of bananas, while other research regarding the detection of guava quality based on RGB values, energy, homogeneity, contrast, and defect area have succeeded in classifying guavas with an accuracy of 91.25% using the K-Nearest Neighbors algorithm (KNN).Therefore, in this study, in addition to using RGB values, energy, homogeneity, and contrast were also carried out in the fuzzy logic algorithm to detect ripeness in bananas. This system classifies bananas into seven levels of ripeness, namely Grade 1 (Very Unripe), Grade 2 (Very Unripe), Grade 3 (Unripe), Grade 4 (Low Ripe), Grade 5 (Almost Ripe), Grade 6 (Ripe), and Grade 7 (Overripe). This research carried out by testing the four GLCM angles (0^0, 45^0, 90^0, dan 135^0) and the results reveal that the angle that produced the model with the highest overall accuracy rate was angle 0^0 with an accuracy of 64.3%.

Keywords: banana ripeness, image processing, fuzzy logic, GLCM features, Tsukamoto method