Fruit-Based Tomato Grading System Based on Features Fusion and SVM Classifier

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Abstract. Machine learning and computer vision techniques have applied for evaluating food quality as well as crops grading. In this paper, a new classification system has been proposed to classify infected/uninfected tomato fruits according to its external surface. The system is based on using feature fusion method with color and texture features. Color moments, GLCM, and Wavelets energy and entropy have been used in the proposed system. Principle Component Analysis (PCA) technique has been used to reduce the feature vector obtained after fusion to avoid dimensionality problem and save time and cost. SVM was used to classify tomato images into 2 classes; infected/uninfected using Min-Max and Z-Score normalization methods. The dataset used in this research contains 177 tomato fruits each was captured from four faces (Top, Side1, Side2, and End). Using 70% of the total images for training phase and 30% for testing, our proposed system achieved accuracy 92%.

Keywords: food quality; feature fusion; Color moments ;GLCM, Wavelets; Tomato; PCA;SVM.