

Random forests based classification for crops ripeness stages

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Abstract. This article presents a classification approach based on random forests algorithm for estimating and classifying the different maturity/ripeness stages of two types of crops; namely tomato and bell pepper (sweet pepper). The proposed approach consists of three phases that are pre-processing, feature extraction, and classification phases. Surface color of tomato and bell pepper is the most important characteristic to observe ripeness. So, the proposed classification system uses color features for classifying ripeness stages. It implements principal components analysis (PCA) along with support vector machine (SVM) algorithms and random forests (RF) classifier for features extraction and classification of ripeness stages, respectively. The datasets used for experiments were constructed based on real sample images for both tomatoes and bell pepper at different stages, which were collected from farms in Minia city, Upper Egypt. Datasets of total 250 and 175 images for tomato and bell pepper, respectively were used for both training and testing datasets. Training dataset is divided into five classes representing the different stages of tomato and bell pepper ripeness. Experimental results showed that SVM with Linear Kernel function achieved accuracy better than RF.

Keywords: image classification; features extraction; ripeness; principal component analysis (PCA); tomato; bell pepper; support vector machine (SVM); random forest (RF)