Multi-class SVM Based Classification Approach for Tomato Ripeness

Esraa Elhariri, Nashwa El-Bendary, Mohamed Mostafa M. Fouad, Jan Platoš, Aboul Ella Hassanien, Ahmed M. M. Hussein

Abstract

This article presents a content-based image classification system to monitor the ripeness process of tomato via investigating and classifying the different maturity/ripeness stages. The proposed approach consists of three phases; namely pre-processing, feature extraction, and classification phases. Since tomato surface color is the most important characteristic to observe ripeness, this system uses colored histogram for classifying ripeness stage. It implements Principal Components Analysis (PCA) along with Support Vector Machine (SVM) algorithms for feature extraction and classification of ripeness stages, respectively. The datasets used for experiments were constructed based on real sample images for tomato at different stages, which were collected from a farm at Minia city. Datasets of 175 images and 55 images were used as training and testing datasets, respectively. Training dataset is divided into 5 classes representing the different stages of tomato ripeness. Experimental results showed that the proposed classification approach has obtained ripeness classification accuracy of 92.72%, using SVM linear kernel function with 35 images per class for training.