

Using a Visible Vision System for On-Line Determination of Quality Parameters of Olive Fruits

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Introduction

- Computer vision has been used as a low-cost, automated and non-destructive to control quality parameters in olives.
- Here, we present a vision system to determine maturity index (MI) and sanitary condition in olives samples.
- This system can be potentially used on-line in the classification of olives improving the quality control of olive oil in factories.

Samples and Image system

Olive samples of picual variety (2 kg) were collected in several olive mills in the province of Jaen (Spain) during November, 2011.

Olives colour ranged from dark green to completely black. The MI was determined by a visual method [1].



Olive samples



Vision system

Images were captured with a JAI AD-080CL multi-spectral camera, combining a visible colour channel (Bayer Mosaic CCD), which can generate 24-bit RGB images and a NIR (near Infrared) channel (monochrome CCD).

This camera was installed in an enclosed cabin equipped with a controlled standard lighting (D65, 6500 K).

Methodology

The images were taken in duplicate through both channels: IR (monochromatic, to distinguish damaged olives) and visible (RGB image, for MI).

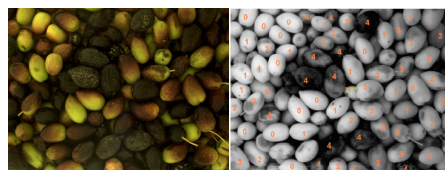
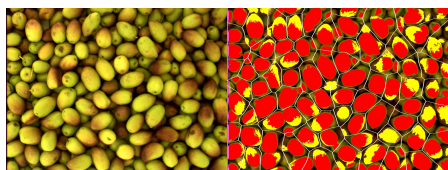
The technique used was the segmentation based on the identification of regions and edges using clusters of pixels selected according to different criteria (colour, boundary or grey levels) [2].

Both supervised and unsupervised methods were used. For colour segmentation, a region containing the colour of interest (colour markers) and classification is performed by using the method of the k-nearest neighbours (KNN) [3]. Unsupervised methods for colour segmentation techniques used clustering algorithms by euclidean distance. [4].

For determination of external defects a gradient-based segmentation of grey levels was performed, and results are collected in percentages as the sum of all pixels in areas occupied by the defects.

Results

- Results were obtained as the percentage of each colour and percentage of defects present in each olives. Five different categories have been agreed according to their level of damage and maturity index.
- Predicted values by the proposed vision method are strongly related to visual values measured in both parameters.
- Optical techniques offer possibilities in the assessment of surface characteristics and quality or composition and it can be potentially applicable for on-line classification and quality control in olive oil industry.



Results of classification for on-line analyzed images for MI and sanitary condition

References

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