

Title Recognition and classification of external skin damage in citrus fruits using multispectral data and morphological features

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Abstract

The computer vision systems currently used for the automatic inspection of citrus fruits are normally based on supervised methods that are capable of detecting defects on the surface of the fruit but are unable to discriminate between different types of defects. Identifying the type of the defect affecting each fruit is very important in order to optimise the marketing profit and to be able to take measures to prevent such defects from occurring in the future. In this paper, we present a computer vision system that was developed for the recognition and classification of the most common external defects in citrus. In order to discriminate between 11 types of defects, images of the defects were acquired in five spectral areas, including the study of near infrared reflectance and ultraviolet induced fluorescence. The system combines spectral information about the defects with morphological estimations of them in order to classify the fruits in categories. The fruit-sorting algorithm proposed here was tested by using it to identify the defects in more than 2000 citrus fruits, including mandarins and oranges. The overall success rate reached 86%.