

External feature based quality evaluation of Tomato using K-means clustering and support vector classification

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Abstract: The exponential growth of the human population and consumer demand of ready to eat food products has encouraged food manufacturers to adapt new strategies, tools and techniques to automate food processing. Among many contributing digital technologies in the fourth industrial revolution is the advanced human-machine interfaces. Fruit classification is an important task to be executed during the post-harvesting and production process. This research work proposes a new image processing application using supervised classifier for quality identification of Tomato fruit. The current post-harvesting process is inadequate in terms of efficiency, accuracy, speed, and cost. The proposed system is an integration of thresholding, clustering and supervised classifiers. It helps to reduce manual efforts and increases the accuracy in terms of grading. The system goes under three processing step i.e image binarization, image clustering and classification. Image binarization is performed using Otsu thresholding algorithm which helps to calculate optimal threshold and binarize the image. In the next step, k-means clustering partitions the image into three different clusters. These clusters are represented using various colors like red, green and blue. The clustering also helps to extract the features such as color, intensity, image quality, image size, and clusters. These features are stored as support vectors which benefits classifier for training and testing. Support vector machine is trained with already grouped 60 different Tomato images. Experimental results proves that high classification accuracy and fast computation time, makes our method appropriate for the real time quality evaluation of fruits.

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