Abstract

Food industry is amongst the industries that largely use machine vision for inspection of produce. Machine vision systems benefit from specially designed digital image processing software to accomplish this task. Color provides valuable information in examining the freshness and estimating the maturity of fruits. The development of an intelligent virtual grader is presented for automatic grading of red delicious apple fruits based on their surface color using machine vision. The heart of the proposed virtual grader is executed in the form of k-nearest neighbor classifier. K-nearest neighbor classifier is chosen for this particular application since it is more robust to noise as compared to other classification algorithms. The performance of the implemented virtual grader is examined experimentally with an industrial grade camera connected to an image grabber of a computer based machine vision system. Results of this study are quite promising. In fact, efficiency achieved using proposed virtual grader is 95.12% if manual grading taken as reference level is assumed to be 100% accurate. However, after having rigorous experimental validation the repeatability of the proposed system is found to be 100%.
Development of an Intelligent Virtual Grader for Estimation of Fruit Quality

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