Abstract

Defects are most likely generated in several ways on fruits, such as fetidness, impact in transform, moistures damage, contusion, creck, mould, green borders, insect stings, opaque color, glittering color, burn, temperature damage or bird's beak. For detecting these defects, easy and fast methods are by appointing a threshold value, which means counting defected pixels and applying and comparing it with total pixels of apple pixel. Defect percentages will be calculated by dividing these two. Although this algorithm is easy and fast, it is affected by the method of illumination. In this research, for determining the apple color, an algorithm was introduced that it is used to determine the quality of apple color. For this purpose, a set of machine vision systems was designed and developed. There was an assumption that a homogenous apple color will present a normal distribution on histogram output. The same theory was also applied to yellow color of apple for image processing. A Ring value method was applied as being a new method. This Ring-Value method will allow the operator to divide an apple into five rings. For each five rings, mean, mode and median were calculated from yellow image frequency histograms. Applying these three factors a Ring-Value was defined for each ring which was shown as M value. Apple color homogenous was determined based on average value of the Ring-Values. According to M value, apples were graded into three classes: high quality, medium quality and low quality. The result of the ring-value methods was compared with experts' comments on graded apples. The Ring-value methods had a high precision with experts' views. Satisfactory results were shown for the comparison of the experts' views and Ring-Value methods, as 90 % for high quality class, 88% for medium quality class and 92% for low quality class.