A Method to Construct Fruit Maturity Color Scales based on Support Vector Machines for Regression: Application to Olives and Grape Seeds

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Color scales are a powerful tool used in agriculture for estimate maturity of fruits. Fruit maturity is an important parameter to determine the harvest time. Typically, to obtain the maturity grade, a human expert visually associates the fruit color with a color present in the scale. In this paper, a computer-based method to create color scales is proposed. The proposed method performs a multidimensional regression based on Support Vector Regression (SVR) to generate color scales. The experimentation considers two color scales examples, the first one for grape seeds, the second one for olives. Grape seed data set contains 250 samples and olives data set has 200 samples. Color scales developed by SVR were validated through K-fold Cross Validation method, using mean squared error as performance function. The proposed method generates scales that adequately follow the evolution of color in the fruit maturity process, provides a tool to define different phenolic pre-harvest stages, which may be of interest to the human expert.