A Radial Basis Function Approach to a Color Image Classification Problem in a Real Time Industrial Application

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(ABSTRACT)

In this thesis, we introduce a radial basis function network approach to solve a color image classification problem in a real time industrial application. Radial basis function networks are employed to classify the images of finished wooden parts in terms of their color and species. Other classification methods are also examined in this work. The minimum distance classifiers are presented since they have been employed by the previous research.

We give brief definitions about color space, color texture, color quantization, color classification methods. We also give an intensive review of radial basis functions, regularization theory, regularized radial basis function networks, and generalized radial basis function networks. The centers of the radial basis functions are calculated by the *k*-means clustering algorithm. We examine the *k*-means algorithm in terms of starting criteria, the movement rule, and the updating rule. The dilations of the radial basis functions are calculated using a statistical method.

Learning classifier systems are also employed to solve the same classification problem. Learning classifier systems learn the training samples completely whereas they are not successful to classify the test samples. Finally, we present some simulation results for both radial basis function network method and learning classifier systems method. A comparison is given between the results of each method. The results show that the best classification method examined in this work is the radial basis function network method.

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