Computer image analysis as a tool for classifying marbling: A case study in dry-cured ham

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Abstract

Marbling in sliced dry-cured ham affects consumer acceptability and the sensory quality of the product. This study presents an automated marbling grading system of dry-cured ham slices which allows for the characterization and classification of the product. Firstly, a sensory marbling grading scale was developed by a panel of experts who did not only take into account the amount of visual fat content, but also the distribution of the fat flecks. This scale was used for the design of an automatic classification system of dry-cured ham based on segmenting intramuscular fat. 643 regions of interest (ROI) of the slice were categorized by a panel of experts using the marbling grading scale and later segmented by the computer system. From the segmented ROI, 48 features (geometrical and textural) were extracted. Using all the data several classifiers were built using two machine learning techniques namely Support Vector Machines (SVM) and Neural Networks (NN). Different feature selection algorithms were tested to select the optimal subset of features. Results show that with a reduced number of features, 89% of the samples could be correctly classified. Performance was better for SVM algorithms than for NN.