

Statistical Feature Extraction Method for Wood Species Recognition System

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Abstract : Effective statistical feature extraction and classification are important in image-based automatic inspection and analysis. An automatic wood species recognition system is designed to perform wood inspection at custom checkpoints to avoid mislabeling of timber which will result in loss of income to the timber industry. The system focuses on analyzing the statistical pore properties of the wood images. This paper proposed a fuzzy-based feature extractor which mimics the experts' knowledge on wood texture to extract the properties of pore distribution from the wood surface texture. The proposed feature extractor consists of two steps namely pore extraction and fuzzy pore management. The total number of statistical features extracted from each wood image is 38 features. Then, a backpropagation neural network is used to classify the wood species based on the statistical features. A comprehensive set of experiments on a database composed of 5200 macroscopic images from 52 tropical wood species was used to evaluate the performance of the proposed feature extractor. The advantage of the proposed feature extraction technique is that it mimics the experts' interpretation on wood texture which allows human involvement when analyzing the wood texture. Experimental results show the efficiency of the proposed method.

Keywords : classification, feature extraction, fuzzy, inspection system, image analysis, macroscopic images

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