A Comparison of Artificial Neural Network Classifiers for Analysis of CT Images for the Inspection of Hardwood Logs

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(Abstract)

This thesis describes an automatic CT image interpretation approach that can be used to detect hardwood defects. The goal of this research has been to develop several automatic image interpretation systems for different types of wood, with lower-level processing performed by feed forward artificial neural networks. In the course of this work, five single-species classifiers and seven multiple-species classifiers have been developed for 2-D and 3-D analysis. These classifiers were trained with back-propagation, using training samples of three species of hardwood: cherry, red oak and yellow poplar. These classifiers recognize six classes: heartwood (clear wood), sapwood, knots, bark, splits and decay. This demonstrates the feasibility of developing general classifiers that can be used with different types of hardwood logs. This will help sawmill and veneer mill operators to improve the quality of products and preserve natural resources.

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