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WOOD SPECIES RECOGNITION USING CNN

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ABSTRACT

This study aims to develop an automated wood species recognition model using Convolutional Neural Networks (CNNs) based on macroscopic wood images. CNNs, known for their effectiveness in image recognition, leverage transfer learning to address limited training data challenges. The study pursues three objectives: feature extraction using CNNs, developing a wood species recognition system, and evaluating CNN model accuracy. Accurate wood identification is crucial for quality control, combating illegal logging, and regulatory compliance. Computer vision, particularly CNNs, offer automated solutions, surpassing labour-intensive traditional methods. The proposed CNN model utilises RGB images for feature extraction and transfer learning for efficient training on limited datasets. Evaluation compares two CNN models, Xception and VGG-16, with Xception demonstrating superior accuracy, precision, and F1-score. The research addresses wood species identification challenges, enhancing industry efficiency. Limitations include dataset size, environmental variability during image capture, and hardware constraints. Future work suggests dataset expansion, consideration of environmental factors, exploration of advanced techniques, and hardware infrastructure upgrades for scalability. Continuous refinement of wood species recognition systems is essential to meet evolving industry demands.

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