Mapping of Pruned Tree-Structured Scalar Quantizers to Companding: A Design Strategy*

John P. Wilson
Department of Computer Science
University of Colorado
Boulder, CO 80309-0430
jwilson@cs.colorado.edu

Pruned tree-structured scalar quantizers are a form of non-uniform scalar quantizer that are named due to being designed via pruning a tree-structured scalar quantizer [1]. If designed via pruning a uniform tree-structured scalar quantizer, such a quantizer may be mapped to a piecewise linear compandor. An algorithm has been developed for mapping a piecewise linear compandor onto a a tree-structured quantizer with uniform decision thresholds. The method for designing piecewise linear compandors was described by Swaszek and Thomas [2], among others. Using the method for design of piecewise linear compandors and the mapping of a compandor onto a tree-structured quantizer provides a linear time method for the design of pruned tree-structured scalar quantizers. The complexity of the algorithm and and the nature of the required side information raise interesting possibilities in coder design. There is also the potential for the development of an algorithm which provides for mapping a piecewise linear compandor design to a non-uniform tree-structured quantizer with a more general structure. In addition, considering non-uniform successive refinement quantizers in terms of companding provides potentially useful insights into other aspects of bit-plane coder design.

References


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