Towards Lossless Compression Using Image Hierarchies

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Abstract: This paper considers lossless image compression for grey-scale connected-set regions. We show that images can be analysed as a hierarchy or tree of connected-set regions. This tree represents a scale-space decomposition of the image and, for complicated images, could contain a great number of nodes. We examine different morphological implementations of skeleton algorithms which can be used for coding regions. We also discuss the possibilities for compression by removing redundancies found between parent-child relations in the nodes of the sieve tree. Although skeletons tend not to be used as an efficient region coding method in general compressors, here we show that they could represent an advantage for certain applications where the images contain large flat-zones or large untextured regions.