Abstract

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Lossless Image Compression Using Agglomerative Hierarchical Clustering and the Jensen-Shannon Divergence

In this paper, we build upon previous work regarding lossless image compression using minimum entropy clustering. In such a setting, blocks of non-overlapping sub-images are grouped into statistically homogeneous clusters. This will be achieved with the aim to minimize the entropy of each cluster, such that the weighted sum of cluster entropies will be less than the entropy of the source non-clustered. Therefore, this results in higher compression ratios overall when compressing each cluster separately compared to when compressing an image as a single source. The approach in this work utilizes partitional, agglomerative and adjacency constrained clustering mechanisms with the Jensen-Shannon divergence used as a dissimilarity measure. Experimental results demonstrated improvements in compression ratios for clustering versus no clustering, as well as improvements made by the proposed Jensen-Shannon dissimilarity measure over previously proposed dissimilarity measures.