Utilizing Index Usage Map for VQ Index Compression

M.F. Abdel-Latif, T.K. Abdel-Hamid, M.M. Doss and H. Selim

Abstract:

In practical vector quantization (VQ) of images, the used pixel block dimensions are kept small to reduce the cost of computations. This in turn results in highly correlated blocks and the corresponding VQ indices will inherit this high correlation. The compression of the basic VQ can be increased through utilising this high correlation of indices by inserting a lossless index compression stage after the VQ stage. A new index compression algorithm is introduced. In this algorithm the 2 dimensional index map is divided into nonoverlapping square blocks. Index usage in each of these blocks is employed to remap (renumber) the reduced number of actually used indices in this block, thus resulting in reduced bit rate expressed in bits/pixel The proposed algorithm reduces the average bit rate by a value depending on the codebook size, namely a reduction of about 32% for codebook size of 64, and down to about 23% for codebook size of 1024. Moreover this algorithm lends itself to being cascaded by other index compression algorithms resulting in increased compression.

Keywords:

VQ Index Compression, Lossless Coding, Image Compression, Vector Quantization.

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