

A Simple Lossless Compression Heuristic for RGB Images

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Lossless image compression methods often consist of two distinct and independent components (context-based methods): *modeling* and *coding*. The modeling phase consists of three components: the prediction of the next pixel, the determination of the context of the next pixel and the probabilistic model for the *prediction residual*, which is the value difference between the actual pixel and the predicted one. In the coding phase, the prediction residuals are encoded. Arithmetic encoders enable the best model driven compressors (CALIC [3]) but they are often ruled out because too complex. The compression gap between simpler techniques and state of the art compressors can be significant. A first step toward a low complexity good compression scheme was FELICS [1], which involves Golomb-Rice codes rather than arithmetic ones. With the same complexity level LOCO-I [2] attains significantly better compression than FELICS (16 percent improvement), only a few percentage points of CALIC.

In this paper, we show a simple lossless compression heuristic for color images in RGB format. The main advantage of this approach is that it provides a highly parallelizable compressor and decompressor. In fact, it can be applied independently to each block of 8x8 pixels and it is competitive with FELICS, achieving 70 to 80 percent of the compression obtained with LOCO-I (JPEG-LS). The compressed form of each block employs a header and a fixed length code. LOCO-I and FELICS have a worse compression performance than our method, if adapted to work on 8x8 blocks in order to achieve the same degree of parallelization for the decompressor.

References

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