

UNIVERSAL LOSSLESS DATA COMPRESSION COMPUTATIONAL EFFECTIVENESS COMPARISON

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Abstract

Advanced instrumentation, dealing with nanoscale technology at the current edge of human scientific enquiry like X-Ray CT, generates an enormous quantity of data from single experiment. The very best modern lossless data compression algorithms use standard approaches and are unable to match high end requirements for mission critical application with full information conservation (a few pixels may vary by com/decom processing). The universal modular arithmetic approach to achieve true lossless com/decom and to overcome those constraints is presented. To check practical implementation performance and effectiveness, an example on computational imaging is presented, benchmarked to standard well-known lossless compression techniques, and critically discussed.

KEYWORDS: True Lossless Compression, Universal Compression, Discrete Tomography, High Data Reliability, Biomedical Informatics, Healthcare.