FAST PEAK AUTOCORRELATION FINDING FOR PERIODICITY-EXPLOITING COMPRESSION METHODS

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Bilevel image compression algorithms like JBIG[1], JBIG2-Generic [1], and PRECIS [2] can exploit 1D or 2D a peak autocorrelation in binary images like 'digital halftones', in order to achieve breakthrough boosts in additional compression. For hard to compress, but periodic halftones, boosts of factors of three or more times the compression ratios and similar increases in decompression speeds can be achieved (boosts defined v.s. the closest related, non-periodicity-exploiting algorithm (e.g. JBIG or JBIG2-Generic with AT>0 v.s. with AT=0, or PRECIS v.s. MMR). Our peak autocorrelation finding method isolates the needed period for peak compression, two orders-of-magnitude faster than the prior art [3].

Our algorithm runs significantly faster than the prior art, in that it (1) operates in a 'run' domain rather than the pixel domain, (2) infers the peak compression lag interval from a peak 'run-based' autocorrelation lag interval, and (3) exploits 'harmonic' periodicities by skipping over candidate lag intervals once the first 'sub-peak' in autocorrelation is found.


Exploiting Periodicity with JBIG2 Compression
(JBIG2-Generic using 10-pel,2-line template/arithmetic coding, AT=0,1,…128)