

Resource Summary Report

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QccPack

RRID:SCR_013240

Type: Tool

Proper Citation

QccPack (RRID:SCR_013240)

Resource Information

URL: <http://qccpack.sourceforge.net>

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Description: QccPack provides an open-source collection of library routines and utility programs for quantization, compression, and coding of data. QccPack has been written to provide very flexible and general implementations of procedures commonly used in coding and compression applications. QccPack is intended for use in the development of prototypes of coding and compression systems, and in academic research. QccPack includes routines for entropy coding, scalar quantization, vector quantization, and wavelet transforms. Additionally, an open-source implementation of SPIHT is available as an optional module. QccPack provides an open-source collection of library routines and utility programs for quantization, compression, and coding of data. QccPack has been written to provide very flexible and general implementations of procedures commonly used in coding and compression applications. The essential component of the QccPack collection is a library (a static library, libQccPack.a, and, if supported on your system, a dynamic library, libQccPack.so) of procedures implementing a large variety of compression and coding algorithms. Application programs may make use of the QccPack library routines by linking the application against the library during compilation. Each library function is very general in its implementation so to be useful in a large variety of applications. Additionally, much of the functionality of the library routines has been provided in the form of stand-alone executable programs. Probably the prime importance of these utility programs is that they provide examples of how to interface with many of the QccPack library routines. The utility programs could also be called from scripts to simulate the operation of complex coding and compression systems before implementing all the system functionality into one stand-alone program. Currently, QccPack consists of over 55,000 lines of C code implementing over 500 library routines and over 50 stand-alone utility programs. The major functionalities currently implemented include: * Entropy coding o Arithmetic coding including multiple-context adaptive and nonadaptive models o Huffman coding o Golomb and adaptive Golomb coding * Scalar Quantization (SQ) o Uniform SQ o Dead-zone SQ o -law and A-law SQ o Lloyd algorithm for optimal SQ design * Vector quantization (VQ) o Generalized Lloyd algorithm (GLA) for VQ-codebook design o Full-search VQ encoding

and decoding o Entropy-constrained-VQ (ECVQ) training, encoding, and decoding o Multistage VQ (MSVQ) (also called residual VQ (RVQ)) training, encoding, and decoding * Adaptive vector quantization (AVQ) o The generalized-threshold-replenishment (GTR) algorithm o The Paul algorithm o Gersho-Yano algorithm o Coding of side information * Wavelet transforms, wavelet-based subband coding o Discrete wavelet transform (DWT) using first-generation filter banks and popular orthonormal and biorthogonal wavelets o Lifting implementations of DWT for popular wavelets o Two-dimensional DWT in the form of dyadic subband pyramids o Three-dimensional DWT in the form of dyadic subband pyramids as well as a packet transform o Shape-adaptive DWT (SA-DWT) for 1D and 2D signals o Redundant DWT (RDWT), aka, the algorithm *trous* o The SR algorithm for wavelet-based image coding o The SFQ algorithm for wavelet-based image coding o The WDR algorithm for wavelet-based image coding o The 3D-WDR algorithm for wavelet-based image-cube coding o The tarp-filter algorithm for wavelet-based image coding o The 3D-tarp algorithm for wavelet-based image-cube coding o The TCE algorithm for wavelet-based image coding o The BISK algorithm for wavelet-based shape-adaptive image coding o The 3D-BISK algorithm for wavelet-based image-cube coding * Error-correcting codes o Field arithmetic, including Gaussian-elimination matrix inversion o Reed-Solomon encoding and decoding o CRC codes o Trellis codes o Hard and soft Viterbi decoding * Image processing o Routines for reading and writing gray and color still images and sequences of images (via PGM and PPM formats) o Routines for reading and writing 3D image-cube volumes o Image and image-sequence deinterlacing o Image differential-pulse-code modulation (DPCM) o Color-space conversions: RGB, YUV, CIE XYZ, CIE UCS, CIE modified UCS o Block-based DCT and inverse DCT * Video coding o The spatial-block algorithm for image-sequence coding o The RDWT-block algorithm for image-sequence coding o The RWMH algorithm for image-sequence coding o Block-based motion estimation and motion compensation o Motion estimation and motion compensation using regular triangle meshes o Encoding and decoding of motion-vector fields * General routines o Vector math (up/down sampling, sorting, dot product, addition/subtraction, etc.) o Matrix math (addition/subtraction, vector-matrix multiplication, etc.) o Linked lists and associated operations o Entropy estimation (first and second order) o General file input and output, including automatic detection and reading/writing of gzip-compressed files o Character bit-packing for binary bitstream input/output o Memory-based fifo for binary bitstreams o Conversion between various file formats used by library routines o Error-message tracking, formatting, and output o Automatic command-line parameter parsing In addition to the standard functionalities listed above, there exist optional modules that can be added to the QccPack library. Usually, these modules are available under licensing terms different from the GPL/LGPL licenses of QccPack and may contain patented algorithms; refer to the documentation included with each module for specific details. These modules are downloaded separately from QccPack and are not enabled by default during the building of QccPack. The currently available optional modules and their functionalities are: * QccPackSPIHT o The Set Partitioning in Hierarchical Trees (SPIHT) algorithm for wavelet-based image coding * QccPackSPECK o The Set-Partitioning Embedded Block (SPECK) algorithm for wavelet-based image coding

Abstract: We describe the QccPack software package, an open-source collection of library routines and utility programs for quantization, compression, and coding of data. QccPack is being written to expedite data-compression research and development by providing general and reliable implementations of common compression techniques. Functionality of the current release includes entropy coding, scalar quantization, vector quantization, adaptive vector quantization, wavelet transforms and subband coding, error-correcting codes, image-processing support, and general vector-math, matrix-math, file-I/O, and

error-message routines. All QccPack functionality is accessible via library calls; additionally, many utility programs provide command-line access. The QccPack software package, downloadable free of charge from the QccPack Web page, is published under the terms of the GNU General Public License and the GNU Library General Public License which guarantee source-code access and as well as allow redistribution and modification. Additionally, there exist optional modules that implement certain patented algorithms. These modules are downloadable separately and are typically issued under licenses that permit only non-commercial use. This material is based upon work supported in part by the National Science Foundation under Grant No. INT-9600260.

Synonyms: QccPack

Resource Type: software resource

Resource Name: QccPack

Resource ID: SCR_013240

Alternate IDs: nif-0000-31387

Record Creation Time: 20220129T080315+0000

Record Last Update: 20260912T195800+0000

Ratings and Alerts

No rating or validation information has been found for QccPack.

No alerts have been found for QccPack.

Data and Source Information

Source: [SciCrunch Registry](#)

Usage and Citation Metrics

We found 1 mentions in open access literature.

Listed below are recent publications. The full list is available at [Kravitz](#) .

Coup?? P, et al. (2008) 3D wavelet subbands mixing for image denoising. International journal of biomedical imaging, 2008, 590183.