PROGRAM
Data Compression Conference (DCC 2019)

Sponsored by U. Arizona, Brandeis U., Microsoft Research, IEEE Signal Processing Society
Proceedings published by IEEE Computer Society Conference Publishing Services (CPS)

Snowbird, Utah, March 26 - March 29, 2019

PROGRAM COMMITTEE
Michael W. Marcellin, University of Arizona (DCC Co-Chair)
James A. Storer, Brandeis University (DCC Co-Chair)
Ali Bilgin, University of Arizona (Committee Co-Chair)
Joan Serra-Sagrista, U. Autonoma de Barcelona (Committee Co-Chair)
Henrique Malvar, Microsoft Research (Publications Chair)
James E. Fowler, Mississippi State University (Publicity Chair)
Charles D. Creusere, New Mexico State University
Travis Gagie, Diego Portales University
Hamid Jafarkhani, University of California Irvine
Giovanni Motta, Google, Inc.
Gonzalo Navarro, University of Chile
Jan Østergaard, Aalborg University
Majid Rabbani, Rochester Institute of Technology
Yuriy Reznik, Brightcove, Inc.
Thomas Richter, Fraunhofer IIS
Victor Sanchez, University of Warwick
Serap Savari, Texas A&M University
Khalid Sayood, University of Nebraska
Rahul Shah, Louisiana State University
Dana Shapira, Ariel University
Ofer Shayevitz, Tel Aviv University
Dafna Sheinwald, IBM Haifa Lab
Iraj Sodagar, Microsoft Corporation
Gary J. Sullivan, Microsoft Corporation
Aaron B. Wagner, Cornell University
Jiangtao Wen, Tsinghua University
Ji-Zheng Xu, Microsoft Research
En-Hui Yang, University of Waterloo
Yan Ye, Alibaba Group

SCHEDULE OVERVIEW:

Tuesday Evening, March 26:
Registration and Reception (7pm - 10pm)

Wednesday, March 27:
Morning: Technical Sessions 1,2,3 (8:00am - 12:40am)
Mid-Day: Keynote Speaker (2:30pm - 3:30pm)
Afternoon: Technical Sessions 4,5 (4:00pm - 7:00pm)

Thursday, March 28:
Morning: Technical Sessions 6,7,8 (8:00am - 12:40am)
Mid-Day: Technical Session 9 (2:30pm - 4:10pm)
Afternoon: Poster Session and Reception (4:30pm - 7:30pm)

Friday, March 29:
Morning: Technical Sessions 10,11 (8:00am - 11:40am)
Afternoon: Technical Sessions 12,13 (noon - 3:00pm)
TUESDAY EVENING - Registration / Reception, 7:00-10:00pm (Golden Cliff Room)

WEDNESDAY MORNING

SESSION 1
8:00am: Learned Neural Iterative Decoding for Lossy Image Compression Systems...............3
  Alexander G. Ororbia II, Lee Giles², Ankur Mali², and David Miller²
  1Rochester Institute of Technology, 2Penn State University
8:20am: Lossy Source Coding via Deep Learning...............................................................13
  Qing Li¹ and Yang Chen²
  ¹Scaleflux, ²University of Michigan
8:40am: Lossy Image Compression with Filter Bank Based Convolutional Networks............23
  Shaohui Li¹, Ziyang Zheng¹, Wenrui Dai², and Hongkai Xiong¹
  ¹Shanghai Jiao Tong University, ²University of California, San Diego
9:00am: Near-Lossless ℓ∞-Constrained Image Decompression via Deep Neural Network...33
  Xi Zhang¹ and Xiaolin Wu¹,²
  ¹Shanghai Jiao Tong University, ²McMaster University

Break: 9:20am - 9:40am

SESSION 2, Advances in Video Coding and its Applications
9:40am: History-Based Motion Vector Prediction in Versatile Video Coding......................43
  Li Zhang¹, Kai Zhang¹, Hongbin Liu¹, Hsiao Chiang Chuang¹, Yue Wang²,
  Jizheng Xu¹, Pengwei Zhao³, and Dingkun Hong³
  ¹ByteDance Inc, ²Beijing ByteDance Technology Co., Ltd.,
  ³Beijing Bytedance Network Technology Co., Ltd
10:00am: Wide Angular Intra Prediction for Versatile Video Coding.....................................53
  Liang Zhao¹, Xin Zhao¹, Shan Liu¹, Xiang Li¹, Jani Lainema², Gagan Rath³,
  Fabrice Urban³, and Fabien Racapé³
  ¹Tencent, ²Nokia, ³Technicolor
10:20am: Fast Adaptive Multiple Transform for Versatile Video Coding ..............................63
  Zhaobin Zhang¹, Xin Zhao², Xiang Li², Zhu Li¹, and Shan Liu²
  ¹University of Missouri - Kansas City, ²Tencent America
10:40am: Adaptive Wavelet Domain Filter for Versatile Video Coding (VVC) .......................73
  Suhong Wang, Xiang Zhang, Shanshe Wang, Siwei Ma, and Wen Gao
  Peking University

Break: 11:00am - 11:20am

SESSION 3
11:20am: Dv2v: A Dynamic Variable-to-Variable Compressor ...........................................83
  Nieves R. Brisaba³, Antonio Fariña¹, Gonzalo Navarro², Adrián Gómez Brandón¹,
  and Tirso V. Rodeiro¹
  ¹University da Coruña, ²University of Chile
11:40am: AliCo: A New Efficient Representation for SAM Files ........................................93
  Idoia Ochoa¹, Hongyi Li³, Florian Baumgarte², Charles Hergenrother³, Jan Voges²,
  and Mikel Hernaez¹
  ¹University of Illinois at Urbana-Champaign, ²Leibniz University,
  ³University of Notre Dame
noon: A Compact Representation of Raster Time Series.....................................................103
  Nataly Curescu¹, Diego Seco¹, and Gilberto Gutiérrez²
  ¹University of Concepción, ²Universidad del Bío-Bío
12:20pm: Numerical Pattern Mining Through Compression .................................................112
  Tatiana Makhalova¹, Sergey O. Kuznetsov¹, and Amedeo Napoli²
  ¹National Research University Higher School of Economics,
  ²Université de Lorraine, CNRS, Inria
Wednesday Lunch Break: 12:40pm - 2:30pm

WEDNESDAY MID-DAY

Keynote Speaker
2:30pm - 3:30pm

25 Years of the BWT:
The Past and the Future of an Unusual Compressor
Giovanni Manzini
Professor, Department of Science and Technological Innovation, University of Eastern Piedmont, Alessandria, Italy

The "Block sorting data compression algorithm" by Mike Burrows and David Wheeler is certainly an unusual compressor. Considered initially by the authors too slow for practical use, it became an everyday tool for lossless compression thanks only to skillful algorithmic engineering.

Eventually, as it is natural, other compressors started outperforming block sorting, but the reversible transformation designed "to make redundancy in the input more accessible", which is at the core of this algorithm, turned out to be an extremely powerful conceptual tool that is still deeply influencing data structure design.

In this talk we try to understand why this transformation is so special, how it has been generalized to work on data quite different from simple sequences, and what are the possible directions for future research.
WEDNESDAY AFTERNOON

SESSION 4

4:00pm: Tunneling on Wheeler Graphs ................................................................. 122
    Jarno N. Alanko¹, Travis Gagie², Gonzalo Navarro³, and Louisa Seelbach Benkner⁴
    ¹University of Helsinki, ²Universidad Diego Portales, ³University of Chile,
    ⁴University of Siegen

4:20pm: Space-Efficient Computation of the Burrows-Wheeler Transform.............. 132
    José Fuentes-Sepúlveda¹, Gonzalo Navarro¹, and Yakov Nekrich²
    ¹University of Chile, ²University of Waterloo

4:40pm: BWT Tunnel Planning is Hard But Manageable ........................................... 142
    Uwe Baier and Kadir Dede
    Ulm University

5:00pm: Parameterized Text Indexing with One Wildcard....................................... 152
    Arnab Ganguly¹, Wing-Kai Hon², Yu-An Huang², Solon Pissis³, Rahul Shah⁴,
    and Sharma Thankachan⁵
    ¹University of Wisconsin - Whitewater, ²National Tsing Hua University,
    ³CWI, Amsterdam, ⁴Louisiana State University, ⁵University of Central Florida

Break: 5:20pm - 5:40pm

SESSION 5, Advances in Video Coding and its Applications

5:40pm: CNN-Based Driving of Block Partitioning for Intra Slices Encoding............ 162
    Franck Galpin, Fabien Racape, Sunil Jaiswal, Philippe Bordes, Fabrice Le Léannec,
    and Edouard Francois
    Technicolor

6:00pm: Perceptually Optimized Bit-Allocation and Associated Distortion Measure
    for Block-Based Image or Video Coding .................................................................... 172
    Christian R Helmrich, Sebastian Bosse, Mischa Siekmann, Heiko Schwarz,
    Detlev Marpe, and Thomas Wiegand
    Fraunhofer HHI

6:20pm: Hybrid Video Coding with Trellis-Coded Quantization ............................... 182
    Heiko Schwarz, Tung Nguyen, Detlev Marpe, and Thomas Wiegand
    Fraunhofer HHI

6:40pm: Deterministic Annealing Based Transform Domain Temporal Predictor Design
    for Adaptive Video Coding ...................................................................................... 192
    Bharath Vishwanath, Kenneth Rose, and Tejaswi Nanjundaswamy
    University of Santa Barbara
THURSDAY MORNING

SESSION 6
8:00am: Practical Indexing of Repetitive Collections Using Relative Lempel-Ziv
Gonzalo Navarro\textsuperscript{1} and Victor Sepulveda\textsuperscript{2}
\textsuperscript{1}University of Chile, \textsuperscript{2}CeBiB
8:20am: LZRR: LZ77 Parsing with Right Reference
Takaaki Nishimoto and Yasuo Tabei
RIKEN Center for Advanced Intelligence Project
8:40am: On Lempel-Ziv Decompression in Small Space
Simon J. Puglisi and Massimiliano Rossi\textsuperscript{2}
\textsuperscript{1}University of Helsinki, \textsuperscript{2}University of Verona
9:00am: Polynomial Time Algorithms for Constructing Optimal AIFV Codes
Mordecai J. Golin and Elfarouk Y. Harb
Hong Kong University of Science and Technology
Break: 9:20am - 9:40am

SESSION 7, Advances in Video Coding and its Applications
9:40am: Texture-Classification Accelerated CNN Scheme for Fast Intra CU Partition in HEVC
Yongfei Zhang\textsuperscript{1}, Gang Wang\textsuperscript{1}, Rui Tian\textsuperscript{2}, Mai Xu\textsuperscript{1}, and C.-C. Jay Kuo\textsuperscript{3}
\textsuperscript{1}Beihang University, \textsuperscript{2}Beijing Institute of Electronic System Engineering, \textsuperscript{3}University of Southern California
10:00am: Enhanced Compression beyond HEVC for Next Generation Content
Kiran Misra, Andrew Segall, Weijia Zhu, Byeongdoo Choi, and Frank Bossen
Sharp
10:20am: Recursive Partitioning Search Space Pruning Using Split Cost Prediction
Adam Wieckowski, Jackie Ma, Heiko Schwarz, Detlev Marpe, and Thomas Wiegand
Fraunhofer HHI
10:40am: A DenseNet Based Approach for Multi-frame In-loop Filter in HEVC
Tianyi Li\textsuperscript{1}, Mai Xu\textsuperscript{1}, Ren Yang\textsuperscript{1}, and Xiaoming Tao\textsuperscript{2}
\textsuperscript{1}Beihang University, \textsuperscript{2}Tsinghua University
Break: 11:00am - 11:20am

SESSION 8, Advances in Video Coding and its Applications
11:20am: Highly Flexible Coding Structures for Next-Generation Video Compression Standard
Fabrice Le Léannec\textsuperscript{1}, Tangi Poirier\textsuperscript{1}, Franck Galpin\textsuperscript{1}, Fabrice Urban\textsuperscript{1}, Edouard François\textsuperscript{1}, Wei-Jung Chien\textsuperscript{2}, Vadim Seregin\textsuperscript{2}, and Marta Karczewicz\textsuperscript{2}
\textsuperscript{1}Technicolor, \textsuperscript{2}Qualcomm
11:40am: Improved Video Coding Techniques for Next Generation Video Coding
Xiaoju Xiu\textsuperscript{1}, Yuwen He\textsuperscript{1}, Yan Ye\textsuperscript{2}, Rahul Vanam\textsuperscript{1}, Philippe Hanhart\textsuperscript{1}, Taoran Lu\textsuperscript{3}, Fangjun Pu\textsuperscript{2}, Peng Yin\textsuperscript{3}, Walt Husak\textsuperscript{2}, and Tao Chen\textsuperscript{2}
\textsuperscript{1}InterDigital Communications, \textsuperscript{2}Alibaba Inc., \textsuperscript{3}Dolby
noon: Extended Quad-Tree Partitioning for Future Video Coding
Meng Wang\textsuperscript{1}, Junru Li\textsuperscript{2}, Li Zhang\textsuperscript{3}, Kai Zhang\textsuperscript{3}, Hongbin Liu\textsuperscript{4}, Shiqi Wang\textsuperscript{1}, Sam Kwong\textsuperscript{1}, and Siwei Ma\textsuperscript{2}
\textsuperscript{1}City University of Hong Kong, \textsuperscript{2}Peking University, \textsuperscript{3}Bytedance Inc.
12:20pm: New Video Codec for High-Quality Video Service and Emerging Applications
Kiho Choi\textsuperscript{1}, Jianle Chen\textsuperscript{2}, Anish Tamse\textsuperscript{1}, Haitao Yang\textsuperscript{2}, Min Woo Park\textsuperscript{1}, Sergey Itonin\textsuperscript{2}, Woongil Choi\textsuperscript{1}, and Semih Esenlik\textsuperscript{2}
\textsuperscript{1}Samsung Electronics, \textsuperscript{2}Huawei Technologies
Thursday Lunch Break: 12:40pm - 2:30pm

THURSDAY MID-DAY

SESSION 9

2:30pm: Rate Allocation for Bayer-Pattern Image Compression with JPEG XS ............320
   Thomas Richter
   Fraunhofer IIS

2:50am: Graph-Based Transform with Weighted Self-Loops for Predictive Transform
   Coding Based on Template Matching........................................................................329
   Debaleena Roy, Tanaya Guha, and Victor Sanchez
   University of Warwick

3:10pm: Quantizers with Parameterized Distortion Measures........................................339
   Jun Guo, Philipp Walk, and Hamid Jafarkhani
   University of California Irvine

3:30pm: Combating Packet Loss in Image Coding Using Oversampling, Irregular
   Interpolation and Noise Shaping.............................................................................349
   Mor Goren and Ram Zamir
   Tel Aviv University

3:50pm: Quantized and Regularized Optimization for Coding Images Using Steered
   Mixtures-of-Experts ...............................................................................................359
   Rolf Jongebloed, Erik Bochinski, Lieven Lange, and Thomas Sikora
   Technische Universität Berlin

POSTER SESSION AND RECEPTION

4:30pm - 7:30pm
   In the Golden Cliff Room

A full listing of participants is at the end this program.
FRIDAY MORNING

SESSION 10, Plenoptic Image Compression
8:00am: Super-Ray Based Low Rank Approximation for Light Field Compression
   Elian Dib¹, Mihaël Le Pendu², Xiaoran Jiang¹, and Christine Guillemot¹
   INRIA Rennes Bretagne Atlantique¹, Trinity College Dublin²
8:20am: Graph-Based Spatio-Angular Prediction for Quasi-Lossless Compression of Light Fields
   Mira Rizkallah, Thomas Maugey, and Christine Guillemot
   INRIA Rennes Bretagne Atlantique
8:40am: Integer Fresnel Transform for Lossless Hologram Compression
   David Blinder¹ and Peter Schelkens²
   ¹Vrije Universiteit Brussels, ²imec
9:00am: Wave Atoms for Lossy Compression of Digital Holograms
   Tobias Birnbaum¹,², Ayyoub Ahar¹,², David Blinder¹,², Colas Schretter¹,³, Tomasz Kozacki¹,³, and Peter Schelkens¹,²
   ¹Vrije Universiteit Brussels, ²imec, ³Warsaw University
9:20am: Lossless Compression of Light Fields Using Multi-reference Minimum Rate Predictors
   João M. Santos¹,², Pedro Amado Assuncao¹,³, Luis A da Silva Cruz¹,², Luís Távora³, Rui Pinto³, and Sergio Faria¹,³
   ¹Instituto de Telecomunicações, ²University of Coimbra, ³Instituto Politécnico de Leiria

Break: 9:40am - 10:00am

SESSION 11, Advances in Video Coding and its Applications
10:00am: An Overview of the OMAF Standard for 360° Video
   Miska Hannuksela¹, Ye-Kui Wang², and Ari Hourunranta¹
   ¹Nokia Technologies, ²Huawei Technologies
10:20am: The Bit Allocation Method Based on Inter-View Dependency for Multi-view Texture Video Coding
   Tiansong Li, Li Yu, Shengju Yu, and Yamei Chen
   Huazhong University of Science and Technology
10:40am: Compact Representations of Dynamic Video Background Using Motion Sprites
   Solomon Garber, Aaditya Prakash, Ryan Marcus, Antonella DiLillo and James Storer
   Brandeis University
11:00am: Intra Picture Prediction for Video Coding with Neural Networks
   Philipp Helle, Jonathan Pfaff, Michael Schäfer, Roman Rischke, Heiko Schwarz, Detlev Marpe, and Thomas Wiegand
   Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI
11:20am: A Multi-pass Coding Mode Search Framework for AV1 Encoder Optimization
   Ching-Han Chiang, Jingning Han, and Yaowu Xu
   Google Inc.
FRIDAY AFTERNOON

Break: 11:40am - noon

SESSION 12
noon: Intra-Prediction Side-Information Reduction Based on Gradient Boundary ...........468
Lucas Nissenbaum, Mumin Jin, and Jae Lim
Massachusetts Institute of Technology

12:20pm: Machine Foveation: An Application-Aware Compressive Sensing Framework..478
Ekdeep S. Lubana¹, Robert Dick², and Vinayak Aggarwal¹
¹Indian Institute of Technology, Roorkee, ²University of Michigan

12:40pm: M to 1 Joint Source-Channel Coding of Gaussian Sources via Dichotomy
of the Input Space Based on Deep Learning ..........................................................488
Yashas Malur, Saidutta Afshin, and Abdi Faramarz Fekri
Georgia Institute of Technology

1:00pm: Advanced 3D Motion Prediction for Video Based Point Cloud Attributes
Compression .................................................................................................................498
Li Li¹, Zhu Li¹², Vladyslav Zakharchenko³, and Jianle Chen³
¹University of Missouri-Kansas City, ²Peng Cheng Lab, ³Futurewei Technologies

Break: 1:20am - 1:40pm

SESSION 13
1:40pm: MR-RePair: Grammar Compression Based on Maximal Repeats.........................508
Isamu Furuya¹, Takuya Takagi¹, Yuto Nakashima², Shunsuke Inenaga²,
Hideo Bannai², and Takuya Kida¹
¹Hokkaido University, ²Kyushu University

2:00pm: RePair in Compressed Space and Time ............................................................518
Kensuke Sakai¹, Tatsuya Ohno¹, Keisuke Goto², Yoshimasa Takabatake¹,
Tomohiro I¹, and Hiroshi Sakamoto¹
¹Kyushu Institute of Technology, ²Fujitsu Laboratories Ltd.

2:20pm: Regular Expression Search on Compressed Text .............................................528
Pierre Ganty¹ and Pedro Valero¹²
¹IMDEA Software Institute, ²Universidad Politécnica de Madrid

2:40pm: Constructing Antidictionaries in Output-Sensitive Space ................................538
Lorraine Ayad¹, Golnaz Badkobeh², Gabriele Fici³, Alice Heliou⁴, and Solon Pissis⁵
¹Kings College London, ²Goldsmiths University of London, ³Università di Palermo,
⁴Independent Researcher, ⁵CWI, Amsterdam
Clustering Regression Wavelet Analysis for Lossless Compression of Hyperspectral Imagery

Eze Ahanonu, Michael Marcellin, and Ali Bilgin
University of Arizona

Fast Depth Decision in Light Field Compression

Hadi Amirpour¹, Antonio Pinheiro¹, Manuela Pereira¹, and Mohammad Ghanbari²,³
¹Instituto de Telecomunicações and Universidade da Beira Interior, ²University of Tehran, ³University of Essex

Light Field Image Compression with Random Access

Hadi Amirpour¹, Antonio Pinheiro¹, Manuela Pereira¹, Fernando J. P. Lopes², and Mohammad Ghanbari³,⁴
¹Instituto de Telecomunicações and Universidade da Beira Interior, ²Instituto de Telecomunicações and Polytechnic Institute of Coimbra, ³University of Tehran, ⁴University of Essex

RDO-Based Light Field Image Coding Using Convolutional Neural Networks and Linear Approximation

Nader Bakir¹,², Wassim Hamidouche¹, Olivier Déforges¹, Khouloud Samrouch², Sid Ahmed Fezza³, and Mohamad Khalil²
¹INSA Rennes, ²Lebanese University, ³National Institute of Telecommunications and ICT

Enhanced Context Sensitive Flash Codes

Gilad Baruch¹, Shmuel T. Klein¹ and Dana Shapira²
¹Bar Ilan University, ²Ariel University

Deep Frame Interpolation for Video Compression

Jean Bégaïnt¹,², Franck Galpin¹, Philippe Guillotet¹, and Christine Guilletmot²
¹Technicolor, ²INRIA

Speckle Reduction for Efficient Coding of Experimental Holograms

Marco V. Bernardo¹, Elsa Fonseca²,³, Antonio M. G. Pinheiro¹,², Paulo T. Fiadeiro²,³, and Manuela Pereira¹,²
¹Instituto de Telecomunicações (IT), ²Universidade da Beira Interior (UBI), ³Fiber Materials and Environmental Technologies (FibEnTech)

Humans are Still the Best Lossy Image Compressors

Ashutosh Bhown¹, Soham Mukherjee², Sean Yang³, Shubham Chandak⁴, Irena Fischer-Hwang², Kedar Tatwawadi⁴, and Tsachy Weissman⁴
¹Palo Alto High School, ²Monta Vista High School, ³Saint Francis High School, ⁴Stanford University

Multiple Reference Line Coding for Most Probable Modes in Intra Prediction

Yao-Jen Chang¹, Hong-Jheng Jhu¹, Hui-Yu Jiang¹, Liang Zhao², Xin Zhao², Xiang Li², Shan Liu², Benjamin Bross³, Paul Keydel³, Heiko Schwarz³, Detlev Marpe³, and Thomas Wiegand³
¹Foxconn, ²Tencent, ³Fraunhofer HHI
Multi-view Multi-modality Priors Residual Network of Depth Video Enhancement for Bandwidth Limited Asymmetric Coding Framework ..................................................... 560

 Siqi Chen1,2, Qiong Liu1,2, and You Yang1,2

 1Huazhong University of Science and Technology, 2Wuhan National Laboratory for Optoelectronics

Fast CU Size Decision Based on AQ-CNN for Depth Intra Coding in 3D-HEVC ............... 561

 Yamei Chen, Li Yu, Tiansong Li, Hongkui Wang, and Shengwei Wang

Huazhong University of Science and Technology

Compressive-Sensed Image Coding via Multi-layer Closed-Loop Prediction .................. 562

 Zan Chen1, Xingsong Hou1, Ling Shao2, and Yuan Huang1

 1Xi’an Jitaotong University, 2Inception Institute of Artificial Intelligence

Accelerating Convolutional Neural Networks with Dynamic Channel Pruning ............... 563

 Cheliang Zhang1, Tao Hu2, Yingda Guan1, and Zuochang Ye1

 1Tsinghua University, 2University of Amsterdam

Online Machine Learning for Fast Coding Unit Decisions in HEVC .......................... 564

 Guilherme Correa, Pargles Dall’Oglio, Daniel Palomino, and Luciano Agostini

Federal University of Pelotas, Brazil

Perceptual Video Coding Based on Visual Saliency Modulated Just Noticeable Distortion .......................................................................................................................... 565

 Jing Cui1, Ruiqin Xiong1, Xinfeng Zhang2, Shanshe Wang1, and Siwei Ma1

 1Peking University, 2University of Southern California

A Hardware-Friendly Extension of Line-Based Intra Prediction for Video Coding .......... 566

 Santiago De-Luxán-Hernández, Adam Wieckowski, Heiko Schwarz, Detlev Marpe, and Thomas Wiegand

Fraunhofer HHI

Multidimensional Compression with Pattern Matching ................................................. 567

 Olivia Del Guercio1, Rafael Orozco2, Alex Sim3, and Kesheng Wu3

 1Scripps College, 2Lawrence Berkeley National Laboratory, 3Bucknell University

An Efficient Coding Method for Spike Camera Using Inter-Spike Intervals ................. 568

 Siwei Dong, Lin Zhu, Daoyuan Xu, Yonghong Tian, and Tiejun Huang

Peking University

Hybrid Point Cloud Geometry Coding Using Planes and Octree Representation Models ............................................................................................................................... 569

 Antoine Dricot and João Ascenso

Instituto de Telecomunicações

Fast PU Intra Mode Decision in Intra HEVC Coding ..................................................... 570

 Kun Duan1,2, Pengyu Liu1,2, Zeqi Feng1,2, and Kebin Jia1,2

 1Beijing University of Technology, 2Beijing Laboratory of Advanced Information Networks

Separable KLT for Intra Coding in Versatile Video Coding (VVC) ................................. 571

 Kui Fan1, Ronggang Wang1, Weisi Lin2, Jong-Uk Hou2, Lingyu Duan1, Ge Li1, and Wen Gao1

 1Peking University, 2Nanyang Technological University

- 10 -
Spike Coding: Towards Lossy Compression for Dynamic Vision Sensor ..................................572
Yihua Fu, Jianing Li, Siwei Dong, Yonghong Tian, and Tiejun Huang
Peking University
A New Distributed Source Coding Problem Related to the Classical-Quantum
Slepian–Wolf Problem.............................................................................................................573
Hachiro Fujita
Tokyo Metropolitan University
Dataflow-Based Joint Quantization for Deep Neural Networks..............................................574
Xue Geng1, Jie Fu2, Bin Zhao3, Jie Lin1, Mohamed M. Sabry Aly4,
Christopher Pal1, and Vijay Chandrasekhar1
1I2R, A*STAR, 2Polytechnique Montreal, 3IME, A*STAR,
4Nanyang Technological University
DeepZip: Lossless Data Compression Using Recurrent Neural Networks ................................575
Mohit Goyal1,3, Kedar Tatwawadi2, Shubham Chandak2, and Idoia Ochoa3
1Indian Institute of Technology Delhi, 2Stanford University, 3University of Illinois
Fast Early Termination of CU Partition and Mode Selection Algorithm
for Virtual Reality Video in HEVC ..........................................................................................576
Xiaohan Guan, Xiaoshao Dong, Mengmeng Zhang, and Zhi Liu
North China University of Technology Beijing
Boosting Backward Search Throughput for FM-Index Using a Compressed
Encoding ..................................................................................................................................577
Jose M. Herruzo1, Sonia González-Navarro1, Pablo Ibáñez2, Victor Viñals2,
Jesús Alastruey-Benedé2, and Oscar Plata1
1University of Malaga, 2University of Zaragoza
Evaluation of Prediction of Quality Metrics for IR Images for UAV Applications .............578
Kabir Hossain, Claire Mantel, and Søren Forchhammer
Technical University of Denmark
Deep Learning Based Angular Intra-Prediction for Lossless HEVC Video Coding ..........579
Hongyue Huang, Ionut Schiopu, and Adrian Munteanu
Vrije Universiteit Brussels
Level-of-Detail Generation Using Binary-Tree for Lifting Scheme in LiDAR
Point Cloud Attributes Coding .............................................................................................580
Birendra Kathariya1,2, Vladyslav Zakharchenko1, Zhu Li2, and Jianle Chen1
1Futurewei Technologies Inc., 2University of Missouri-Kansas City
On the Randomness of Compressed Data ..............................................................................581
Shmuel T. Klein1 and Dana Shapira2
1Bar Ilan University, 2Ariel University
Better Than Optimal Huffman Coding? .................................................................................582
Shmuel T. Klein1, Shoham Saadia2, and Dana Shapira2
1Bar Ilan University, 2Ariel University
Selective Dynamic Compression ...............................................................................................583
Shmuel T. Klein1, Elina Opalinsky2, and Dana Shapira2
1Bar Ilan University, 2Ariel University
A New Technique for Lossless Compression of Color Images Based on Hierarchical Prediction, Inversion and Context Adaptive Coding.................................584
Basar Koc1, Ziya Arnavut2, Dilip Sarkar3, and Hüseyin Koçak3
Stetson University1, SUNY Fredonia2, University of Miami3
Generalized Word Equations: A New Approach to Data Compression..........................585
Michal Kutwin, Wojciech Plandowski, and Artur Zaroda
University of Warsaw
Signal Reconstruction Performance Under Quantized Noisy Compressed Sensing.........586
Markus Leinonen1, Marian Codreanu2, and Markku Juntti1
1University of Oulu, 2Linköping University
Bi-Intra Prediction for Versatile Video Coding..............................................................587
Congrui Li1, Zhenghui Zhao2, Junru Li2, Xiang Zhang2, Siwei Ma2, and Chen Li1
1China University of Mining and Technology, 2Peking University
Adaptive Quantization Parameter Selection Leveraging the Inter-Frame Distortion Propagation for HEVC Video Coding..................................................588
Dong Li, Haibing Yin, Xiaofeng Huang, and Hang Li
Hangzhou Dianzi University
An End-to-End Encrypted Neural Network for Gradient Updates Transmission in Federated Learning ..........................................................589
Hongyu Li and Tianqi Han
ZhongAn Information Technology Service Co., Ltd. Shanghai City
Incremental Deep Neural Network Pruning Based on Hessian Approximation............590
Li Li1, Zhu Li1, Yue Li2, Birendra Kathariya1, and Shuvra Bhattacharyya1
1University of Missouri-KC, 2University of Science and Technology China, 3University of Maryland
Improving Cube-to-ERP Conversion Performance with Geometry Features of 360 Video Structure ...............................................................591
Ning Yu, Chunyu Lin, Huihui Bai, Meiqin Liu, and Yao Zhao
Beijing Jiaotong University
Perception-Optimized Encoding for Visually Lossy Image Compression.......................592
Yuzhang Lin1, Feng Liu2, Miguel Hernandez-Cabronero1, Eze Ahanonu1, Michael Marcellin1, Ali Bilgin1, and Amit Ashok1
1The University of Arizona, 2Nankai University
Fast Intra Prediction Algorithm for Virtual Reality 360 Degree Video Based on Improved RMD .................................................................593
Zhi Liu, Cai Xu, Xiaohan Guan, and Mengmeng Zhang
North China University of Technology
A CU Split Early Termination Algorithm Based KNN for 360-Degree Video..............594
Zhi Liu, Peiran Song, and Mengmeng Zhang
North China University of Technology
Fast Encoding Algorithms for SHVC Intra/Inter Coding ..............................................595
Xin Lu1, Chang Yu1, and Graham Martin2
1Harbin Institute of Technology, 2University of Warwick
Rice-Marlin Codes: Tiny and Efficient Variable-to-Fixed Codes

Manuel Martinez¹ and Joan Serra-Sagristà²
¹Karlsruhe Institute of Technology, ²Universitat Autònoma de Barcelona

Decoder-Side Intra Mode Derivation Based on a Histogram of Gradients in Versatile Video Coding

Anthony Nasrallah, Elie Mora, Thomas Guionnet, and Mickael Raulet
ATEME

Vectorizing Fast Compression

Gregory Tucker and Roy Oursler
Intel Corporation

A Measurement Coding System for Block-Based Compressive Sensing Images by Using Pixel-Domain Features

Jirayu Peetakul, Jinjia Zhou, and Koichi Wada
Hosei University

Rate Control Algorithm in HEVC Based on Scene-Change Detection

Jia Qin¹,², Huihui Bai¹,², and Yao Zhao¹,²
¹Beijing Jiaotong University, ²Beijing Key Laboratory of Advanced Information Science and Network Technology

Dynamic Lists for Efficient Coding of Intra Prediction Modes in the Future Video Coding Standard

Kevin Reuze¹, Wassim Hamidouche¹, Pierrick Philippe², and Olivier Déforges
¹INSA Rennes, ²Orange

Client-Driven Transmission of JPEG2000 Image Sequences Using Motion Compensated Conditional Replenishment

J.J. Sánchez-Hernández¹, V. González-Ruiz¹, J.P. García-Ortiz¹, and D. Müller²
¹University of Almería, ²European Space Agency

Graph Filtering For Data Reduction and Reconstruction

Ioannis D. Schizas
University of Texas at Arlington

Median Binary-Connect Method and a Binary Convolutional Neural Network for Word Recognition

Spencer Sheen¹ and Jiancheng Lyu²
¹UC San Diego, ²UC Irvine

FastIntra360: A Fast Intra-Prediction Technique for 360-Degrees Video Coding

Iago Storch¹, Bruno Zatti¹, Luciano Agostini¹, Luis A. da Silva Cruz², and Daniel Palomino¹
¹Federal University of Pelotas, ²University of Coimbra

Hardware-Friendly Intra Region-Based Template Matching for VVC

Gayathri Venugopal, Philipp Helle, Karsten Müller, Detlev Marpe, and Thomas Wiegand
Fraunhofer Heinrich Hertz Institute (HHI)
Hard-Decision Quantization Algorithm Based on Deep Learning in Intra Video Coding.................................................................607

Hongkui Wang, Shengju Yu, Ying Zhang, Zhuo Kuang, and Li Yu
Huazhong University of Science & Technology

A Global Co-saliency Guided Bit Allocation for Light Field Image Compression ..........608
Kejun Wu1,2, Zongbang Liao1,2, Qiong Liu1,2, Yaguang Yin3, and You Yang1,2
1Huazhong University of Science and Technology, 2Wuhan National Laboratory for Optoelectronics, 3Academy of Broadcasting Science

Efficient and Fast Coefficient Sign Inference for Video Coding ..................................609
Daoyuan Xu1, Peiyin Xing1, Yaowei Wang2,3, and Yonghong Tian1,2
1Peking University, 2Pengcheng Laboratory, 3Beijing Institute of Technology

DNQ: Dynamic Network Quantization ........................................................................610
Yuhui Xu1, Shuai Zhang2, Yingyong Qi2, Jiaxian Guo1, Weiyao Lin1, and Hongkai Xiong1
1Shanghai Jiao Tong University, 2Qualcomm AI Research

Bank Select Method for Reducing Symbol Search Operations on Stream-Based Lossless Data Compression........................................611
Shinichi Yamagiwa, Ryuta Morita, and Koichi Marumo
University of Tsukuba

Event-Triggered Stochastic Control via Constrained Quantization ............................612
Hikmet Yildiz1, Yu Su1, Anatoly Khina2, and Babak Hassibi1
1California Institute of Technology, 2Tel Aviv University

Enhanced Intra Block Copy with Planar Perspective Transformation for Urban Building Scenes ..............................................................613
Qijun Wang, Chen Zhang, Jiafei Xu, and Chao Yang
Anhui University

Fast PU Early Termination Algorithm Based on WMSE for ERP Video Intra Prediction ...............................................................................614
Mengmeng Zhang1, Renbo Su1, Zhi Liu1, Fuqi Mao1,2, and Wen Yue2
1North China University of Technology, 2China University of Geosciences

Deep Multiple Description Coding by Learning Scalar Quantization ..........................615
Lijun Zhao1, Huihui Bai1, Anhong Wang2, and Yao Zhao1
1Beijing Jiaotong University, 2Taiyuan University of Science and Technology

ResGAN: A Low-Level Image Processing Network to Restore Original Quality of JPEG Compressed Images ........................................616
Chunbiao Zhu1, Yuanqi Chen1, Yiwei Zhang1, Shan Liu2, and Ge Li1
1Peking University, 2Tencent America