

2020 Data Compression Conference (DCC 2020)

**Snowbird, Utah, USA
24 – 27 March 2020**



**IEEE Catalog Number: CFP20DCC-POD
ISBN: 978-1-7281-6458-8**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

| | |
|-------------------------|-------------------|
| IEEE Catalog Number: | CFP20DCC-POD |
| ISBN (Print-On-Demand): | 978-1-7281-6458-8 |
| ISBN (Online): | 978-1-7281-6457-1 |
| ISSN: | 1068-0314 |

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Technical Sessions

Session 1

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| DRASIC: Distributed Recurrent Autoencoder for Scalable Image Compression..... | 3 |
| <i>Enmao Diao¹, Jie Ding², and Vahid Tarokh¹</i> | |
| ¹ Duke University, ² University of Minnesota-Twin Cities | |
| Deep Learning-Based Image Compression with Trellis Coded Quantization | 13 |
| <i>Binglin Li¹, Mohammad Akbari¹, Jie Liang¹, and Yang Wang²</i> | |
| ¹ Simon Fraser University, ² University of Manitoba | |
| The Sibling Neural Estimator: Improving Iterative Image Decoding with Gradient Communication..... | 23 |
| <i>Ankur Mali¹, Alexander G. Ororbia², and C. Lee Giles¹</i> | |
| ¹ The Pennsylvania State University, ² Rochester Institute of Technology | |
| Noise-to-Compression Variational Autoencoder for Efficient End-to-End Optimized Image Coding..... | 33 |
| <i>Jixiang Luo¹, Shaohui Li¹, Wenrui Dai^{1,2}, Yuhui Xu¹, De Cheng², Gang Li², and Hongkai Xiong¹</i> | |
| ¹ Shanghai Jiao Tong University, ² Huawei Cloud | |

Session 2

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| EPIC: Context Adaptive Lossless Light Field Compression using Epipolar Plane Images | 43 |
| <i>Muhammad Umair Mukati and Søren Forchhammer</i> | |
| DTU Fotonik\ Technical University of Denmark | |
| Super-Resolution in Compressive Coded Imaging Systems via $l_2 - l_1 - l_2$ Minimization Under a Deep Learning Approach..... | 53 |
| <i>Hans Garcia, Miguel Marquez, and Henry Arguello</i> | |
| Universidad Industrial de Santander | |
| Gaussian Guided Inter Prediction for Focal Stack Images Compression | 63 |
| <i>Kejun Wu^{1,2}, Qiong Liu^{1,2}, Yaguang Yin³, and You Yang^{1, 2}</i> | |
| ¹ Huazhong University of Science and Technology, ² Wuhan National Laboratory for Optoelectronics, ³ Academy of Broadcasting Science, China | |
| Implicit Geometry Partition for Point Cloud Compression..... | 73 |
| <i>Xiang Zhang, Wen Gao, and Shan Liu</i> | |
| Tencent | |

Session 3

| | |
|-----------------------------------------------------------------------------------------|----|
| Residual Coding for Transform Skip Mode in Versatile Video Coding | 83 |
| <i>Tung Nguyen, Benjamin Bross, Heiko Schwarz, Detlev Marpe, and Thomas Wiegand</i> | |
| Fraunhofer HHI | |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Advanced Geometric-Based Inter Prediction for Versatile Video Coding | 93 |
| <i>Han Gao¹, Ru-Ling Liao², Kevin Reuzé³, Semih Esenlik¹, Elena Alshina¹, Yan Ye², Jie Chen², Jiancong Luo², Chun-Chi Chen³, Han Huang³, Wei-Jung Chien³, Vadim Seregin³, and Marta Karczewicz³</i> | |
| ¹ Huawei Technologies, ² Alibaba Group, ³ Qualcomm Inc | |
| Gradient-Based Early Termination of CU Partition in VVC Intra Coding..... | 103 |
| <i>Jing Cui¹, Tao Zhang², Chenchen Gu², Xinfeng Zhang³, and Siwei Ma¹</i> | |
| ¹ Peking University, ² Tencent, ³ UCAS | |

Session 4

| | |
|------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Semantrix: A Compressed Semantic Matrix..... | 113 |
| <i>Nieves R. Brisaboa¹, Antonio Fariña¹, Gonzalo Navarro², and Tirso Varela Rodeiro¹</i> | |
| ¹ Universidad de Coruña, ² University of Chile | |
| Revisiting Compact RDF Stores Based on k2-Trees | 123 |
| <i>Nieves R. Brisaboa, Ana Cerdeira-Pena, Guillermo De Bernardo, and Antonio Fariña</i> | |
| Universidad de Coruña | |
| Bitvectors with Runs and the Successor/Predecessor Problem | 133 |
| <i>Adrián Gómez-Brandón</i> | |
| Universidad de Coruña | |

Session 5

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Decompressing Lempel-Ziv Compressed Text | 143 |
| <i>Philip Bille¹, Mikko Berggren Ettiienne¹, Travis Gagie², Inge Li Gørtz¹, and Nicola Prezza³</i> | |
| ¹ Technical University of Denmark, ² Dalhousie University, ³ LUISS University of Rome | |
| Approximating Optimal Bidirectional Macro Schemes..... | 153 |
| <i>Luís M. S. Russo¹, Ana Sofia D. Correia¹, Gonzalo Navarro², and Alexandre P. Francisco¹</i> | |
| ¹ Instituto Superior Técnico Universidade de Lisboa, ² University of Chile | |

Session 6

| | |
|-------------------------------------------------------------------------------------------------------------------------------|-----|
| State-Based Multi-parameter Probability Estimation for Context-Based Adaptive Binary Arithmetic Coding..... | 163 |
| <i>Paul Haase, Stefan Matlage, Heiner Kirchhoffer, Christian Bartnik, Heiko Schwarz, Detlev Marpe, and Thomas Wiegand</i> | |
| Fraunhofer Heinrich-Hertz-Institute (HHI) | |
| Reverse Multi-Delimiter Compression Codes | 173 |
| <i>Igor Zavadskiy and Anatoly V. Anisimov</i> | |
| Taras Shevchenko National University of Kyiv | |

Session 7

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Convolutional Neural Network-Based Coefficients Prediction for HEVC Intra-Predicted Residues | 183 |
| <i>Changyue Ma¹, Dong Liu¹, Li Li², Yao Wang³, and Feng Wu¹</i> | |
| ¹ University of Science and Technology of China, ² University of Missouri-Kansas City, ³ New York University | |
| Luma Mapping with Chroma Scaling in Versatile Video Coding | 193 |
| <i>Taoran Lu¹, Fangjun Pu¹, Peng Yin¹, Sean McCarthy¹, Walt Husak¹, Tao Chen¹, Edouard Francois², Christophe Chevance², Franck Hiron², Jie Chen³, Ru-Ling Liao³, Yan Ye³, and Jiancong Luo³</i> | |
| ¹ Dolby Laboratories Inc., ² InterDigital, ³ Alibaba Group | |
| Sub-Sampled Cross-Component Prediction for Chroma Component Coding | 203 |
| <i>Junru Li¹, Meng Wang², Li Zhang³, Kai Zhang³, Shiqi Wang², Shanshe Wang¹, Siwei Ma¹, and Wen Gao¹</i> | |
| ¹ Peking University, ² City University of Hong Kong, ³ Bytedance Inc. | |

Session 8

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| On Dynamic Succinct Graph Representations | 213 |
| <i>Miguel E. Coimbra¹, Alexandre P. Francisco¹, Luís M. S. Russo¹, Guillermo De Bernardo^{2,3}, Susana Ladra³, and Gonzalo Navarro⁴</i> | |
| ¹ Universidade de Lisboa, ² Universidade da Coruña, ³ Enxenio SL, ⁴ University of Chile | |
| Edge Minimization in de Bruijn Graphs | 223 |
| <i>Uwe Baier, Thomas B uchler, Enno Ohlebusch, and Pascal Weber</i> University of Ulm | |
| Compact Representation of Graphs with Small Bandwidth and Treedepth..... | 233 |
| <i>Shahin Kamali</i> University of Manitoba | |
| c-Trie++: A Dynamic Trie Tailored for Fast Prefix Searches..... | 243 |
| <i>Kazuya Tsuruta¹, Dominik K oppl^{1,2}, Shunsuke Kanda³, Yuto Nakashima¹, Shunsuke Inenaga¹, Hideo Bannai¹, and Masayuki Takeda¹</i> | |
| ¹ Kyushu University, ² Japan Society for Promotion of Science, ³ RIKEN, Japan | |

Session 9

| | |
|---------------------------------------------------------------------------------------------------------------------------|-----|
| Spectral Video Compression Using Convolutional Sparse Coding | 253 |
| <i>Crisostomo Alberto Barajas-Solano¹, Juan-Marcos Ramirez², and Henry Arguello¹</i> | |
| ¹ Universidad Industrial de Santander, ² Universidad Rey Juan Carlos | |
| Online Probability Model Estimation for Video Compression | 263 |
| <i>Yue Sun^{1,2}, Jingning Han¹, and Yaowu Xu²</i> | |
| ¹ University of Washington, ² Google Inc | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Revisiting Local Texture Correlation for Rate-Distortion Optimized Intra Coding | 273 |
| <i>Meng Wang¹, Junru Li², Li Zhang³, Hongbin Liu⁴, Jizheng Xu³, and Shiqi Wang¹</i> | |

¹City University of Hong Kong, ²Peking University, ³Bytedance Inc., USA,

⁴Bytedance (HK) Limited., Hong Kong

Session 10

| | |
|-----------------------------------------------------------------------------------------------------------------|-----|
| Tensor Dictionary Learning with Representation Quantization for Remote Sensing Observation Compression | 283 |
|-----------------------------------------------------------------------------------------------------------------|-----|

Anastasia Aidini^{1, 2}, Grigorios Tsagkatakis², and Panagiotis Tsakalides^{1, 2}

¹University of Crete, ²Institute of Computer Science, FORTH

| | |
|--------------------------------------------------------------------------------------------------|-----|
| A Stochastic Model of Block Segmentation Based on the Quadtree and the Bayes Code for It..... | 293 |
|--------------------------------------------------------------------------------------------------|-----|

Yuta Nakahara and Toshiyasu Matsushima

Waseda University

| | |
|-----------------------------------------------------------------------|-----|
| Denosing Deep Boltzmann Machines: Compression for Deep Learning | 303 |
|-----------------------------------------------------------------------|-----|

Qing Li¹ and Yang Chen²

¹Western Digital, ²University of Michigan

| | |
|-----------------------------------------------------------------------------------------|-----|
| Encryption Before Compression Coding Scheme for JPEG Image Compression Standard..... | 313 |
|-----------------------------------------------------------------------------------------|-----|

Dariusz Puchala, Kamil Stokfiszewski, and Mykhaylo Yatsymirskyy

Lodz University of Technology

Session 11

| | |
|---------------------------------------------------------------------------------------------------------------------|-----|
| The Exponential Distribution in Rate Distortion Theory: The Case of Compression with Independent Encodings | 323 |
|---------------------------------------------------------------------------------------------------------------------|-----|

Uri Erez¹, Jan Østergaard², and Ram Zamir¹

¹Tel Aviv University, ²Aalborg University

| | |
|---------------------------------|-----|
| Functional Epsilon Entropy..... | 332 |
|---------------------------------|-----|

Sourya Basu, Daewon Seo, and Lav R. Varshney

University of Illinois at Urbana-Champaign

| | |
|----------------------------------------------------------------------------------------------------------|-----|
| LFZip: Lossy Compression of Multivariate Floating-Point Time Series Data via Improved Prediction..... | 342 |
|----------------------------------------------------------------------------------------------------------|-----|

Shubham Chandak¹, Kedar Tatwawadi¹, Chengtao Wen², Lingyun Wang²,

Juan Aparicio², and Tsachy Weissman¹

¹Stanford University, ²Siemens Corporation

Poster Session

(listed alphabetically by first author)

| | |
|------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Compressing and Randomly Accessing Sequences (note) | 355 |
| <i>Laith Ali Abdusahib¹, Diego Arroyuelo², and Rajeev Raman¹</i> | |
| ¹ University of Leicester, ² IMFD and Technical University of Federico Santa Maria | |
| Concise Fuzzy Representation of Big Graphs: A Dimensionality Reduction Approach | 356 |
| <i>Faisal Abu Khzam, Amer Haj Ahmad, and Rana Mouawi</i> | |
| Lebanese American University | |
| Lossless Multi-component Image Compression Based on Integer Wavelet Coefficient Prediction using Convolutional Neural Networks..... | 357 |
| <i>Eze Ahanonu, Michael Marcellin, and Ali Bilgin</i> | |
| University of Arizona | |
| Fast Multi-rate Encoding for Adaptive HTTP Streaming..... | 358 |
| <i>Hadi Amirpour¹, Ekrem Çetinkaya¹, Christian Timmerer^{1,2}, and Mohammad Ghanbari^{3,4}</i> | |
| ¹ Alpen-Adria-Universität Klagenfurt, Austria, ² Bitmovin, Austria | |
| ³ University of Tehran, ⁴ University of Essex | |
| Compressive Classification via Deep Learning using Single-Pixel Measurements..... | 359 |
| <i>Jorge Bacca, Nelson Diaz, and Henry Arguello</i> | |
| Universidad Industrial de Santander | |
| Decode-Efficient Prefix Codes for Hierarchical Memory Models | 360 |
| <i>Shashwat Banchoor¹, Rishikesh R. Gajjala¹, Yogish Sabharwal², and Sandeep Sen^{1,3}</i> | |
| ¹ Indian Institute of Technology, ² IBM Research, Delhi, | |
| ³ Shiv Nadar University, India | |
| Pattern Search in Grammar-Compressed Graphs | 361 |
| <i>Stefan Böttcher, Rita Hartel, and Sven Peeters</i> | |
| Paderborn University | |
| Video Denoising for the Hierarchical Coding Structure in Video Coding | 362 |
| <i>Cheng Chen, Jingning Han, and Yaowu Xu</i> | |
| Google Inc. | |
| Efficient Storage of Images onto DNA using Vector Quantization..... | 363 |
| <i>Melpomeni Dimopoulou and Marc Antonini</i> | |
| Université Côte d'Azur, I3S, CNRS | |
| Image Compression Based on Neuroscience Models: Rate-Distortion Performance of the Neural Code..... | 364 |
| <i>Effrosyni Doutsis¹ and Panagiotis Tsakalides²</i> | |
| ¹ Foundation for Research and Technology - Hellas, ² University of Crete | |
| On the Robustness of Causal Discovery with Additive Noise Models on Discrete Data | 365 |
| <i>Kang Du, Austin Goddard, and Yu Xiang</i> | |
| University of Utah | |
| Entropy Coders Based on the Splitting of Lexicographic Intervals | 366 |
| <i>Danny Dubé</i> | |
| Université Laval | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Intra Prediction in the Emerging VVC Video Coding Standard..... | 367 |
| <i>Alexey Filippov¹, Vasily Rufitskiy¹, Jianle Chen², and Elena Alshina³</i> | |
| ¹ Huawei Technologies Co., Ltd., ² Futurewei Technologies, ³ Huawei Technologies, Düsseldorf GmbH | |
| Weighted Adaptive Huffman Coding | 368 |
| <i>Aharon Fruchtmann¹, Yoav Gross¹, Shmuel T. Klein², and Dana Shapira¹</i> | |
| ¹ Ariel University, ² Bar Ilan University | |
| Practical Repetition-Aware Grammar Compression | 369 |
| <i>Isamu Furuya</i> Hokkaido University | |
| Towards Better Compressed Representations..... | 370 |
| <i>Michał Gańczorz</i> University of Wrocław | |
| Low Rate Compression of Video with Dynamic Backgrounds | 371 |
| <i>Solomon Garber¹, Ryan Marcus², Antonella DiLillo¹, and James Storer¹</i> | |
| ¹ Brandeis University, ² MIT CSAIL | |
| DZip: Improved General-Purpose Lossless Compression Based on Novel Neural Network Modeling | 372 |
| <i>Mohit Goyal¹, Kedar Tatwawadi², Shubham Chandak², and Idoia Ochoa¹</i> | |
| ¹ University of Illinois at Urbana Champaign, ² Stanford University | |
| Artificial Intelligence Based Region of Interest Enhanced Video Compression | 373 |
| <i>Palanivel Guruvareddiar and Praveen Prasad</i> Intel Corporation | |
| Machine-Learning-Based Method for Finding Optimal Video-Codec Configurations Using Physical Input-Video Features | 374 |
| <i>Roman Kazantsev, Sergey Zvezdakov, and Dmitriy Vatolin</i> Lomonosov Moscow State University | |
| Perceptual Video Coding using Deep Neural Network Based JND Model | 375 |
| <i>Jongho Kim¹, Dae Yeol Lee^{1,2}, Seyoon Jeong¹, and Seunghyun Cho¹</i> | |
| ¹ Electronics and Telecommunications Research Institute, ² University of Texas at Austin | |
| Non-Binary Robust Universal Variable Length Codes | 376 |
| <i>Shmuel T. Klein¹, Tamar C. Serebro², and Dana Shapira²</i> | |
| ¹ Bar Ilan University, ² Ariel University | |
| Re-Pair in Small Space | 377 |
| <i>Dominik Köppl¹, Tomohiro I¹, Isamu Furuya³, Yoshimasa Takabatake², Kensuke Sakai², and Keisuke Goto⁴</i> | |
| ¹ Kyushu University/JSPS, ² Kyushu Institute of Technology, ³ Hokkaido University, ⁴ Fujitsu Laboratories Ltd. | |
| Video-Based Compression for Plenoptic Point Clouds | 378 |
| <i>Li Li¹, Zhu Li¹, Shan Liu¹, and Houqiang Li²</i> | |
| ¹ University of Missouri-Kansas City, ² Tencent America, ³ University of Science and Technology of China | |
| Secondary Intra Prediction Scheme for HEVC..... | 379 |
| <i>Junhui Liang, Yamei Chen, Hongkui Wang, Hailang Yang, and Li Yu</i> Huazhong University of Science and Technology | |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Convolutional Neural Network Based Fast Intra Mode Prediction for H.266/FVC Video Coding | 380 |
| <i>Ting-Lan Lin¹, Kai-Wen Liang², Jing-Ya Huang², Yu-Liang Tu², and Pao-Chi Chang²</i> | |
| ¹ National Taipei University of Technology, ² National Central University, Taiwan | |
| Fast Depth Intra Coding Based on Layer-Classification and CNN for 3D-HEVC | 381 |
| <i>Chang Liu¹, Kebin Jia^{1,2}, Pengyu Liu^{1,2}, and Zhonghua Sun^{1,2}</i> | |
| ¹ Beijing University of Technology, ² Beijing Key Laboratory of Computational Intelligence and Intelligent System | |
| A Rate Control Scheme for HEVC Intra Coding Using Convolution Neural Network (CNN) | 382 |
| <i>Xin Lu¹, Bixing Zhou¹, Xuesong Jin², and Graham Martin³</i> | |
| ¹ Harbin Institute of Technology, ² Harbin University of Commerce, ³ University of Warwick | |
| Compressed Quadraticization of Higher Order Binary Optimization Problems | 383 |
| <i>Avradip Mandal, Arnab Roy, Sarvagya Upadhyay, and Hayato Ushijima-Mwesigwa</i> | |
| Fujitsu Laboratories of America | |
| Flow-Guided Temporal-Spatial Network for HEVC Compressed Video Quality Enhancement | 384 |
| <i>Xiandong Meng¹, Xuan Deng², Shuyuan Zhu², Shuaicheng Liu², and Bing Zeng²</i> | |
| ¹ The Hong Kong University of Science and Technology, ² University of Electronic Science and Technology of China | |
| Statistical Modeling Based Fast Rate Distortion Estimation Algorithm for HEVC | 385 |
| <i>Xiang Meng¹, Xiaofeng Huang¹, Haibin Yin¹, Shengsheng Zheng¹, and Shiqi Wang²</i> | |
| ¹ Hangzhou Dianzi University, ² City University of Hong Kong | |
| Grammar Compression with Probabilistic Context-Free Grammar | 386 |
| <i>Hiroaki Naganuma¹, Diptarama Hendrian¹, Ryo Yoshinaka¹, Ayumi Shinohara¹, and Naoki Kobayashi²</i> | |
| ¹ Tohoku University, ² The University of Tokyo | |
| Temporal Redundancy Reduction in Compressive Video Sensing by using Moving Detection and Inter-Coding | 387 |
| <i>Jirayu Peetakul and Jinjia Zhou</i> | |
| Hosei University of Science and Technology | |
| Training Machine Learning on JPEG Compressed Images | 388 |
| <i>Maxime Pistono^{1,2}, Gouenou Coatrieux¹, Jean-Claude Nunes², and Michel Cozic³</i> | |
| ¹ IMT Atlantique, ² Universite de Rennes 1, ³ MEDECOM | |
| Segmentation of Text-Lines and Words from JPEG Compressed Printed Text Documents Using DCT Coefficients | 389 |
| <i>Bulla Rajesh¹, Mohammed Javed¹, P. Nagabhushan¹, and Watanabe Osamu²</i> | |
| ¹ Indian Institute of Information Technology Allahabad, ² Takushoku University | |
| Scalable Trellis Quantization for JPEG XS | 390 |
| <i>Thomas Richter</i> | |
| Fraunhofer IIS | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| SQUAREMIX: A Faster Pseudorandom Number Generator for Dynamic-Multithreading Platforms | 391 |
| <i>Robert Ritchie and Khodakhast Bibak</i> | |
| Miami University | |
| Model-Independent Rate Control for Intra-Coding Based on Piecewise Linear Approximations | 392 |
| <i>Victor Sanchez</i> | |
| University of Warwick | |
| Depth-First Decoding of Distributed Arithmetic Codes for Uniform Binary Sources | 393 |
| <i>Bowei Shan¹, Yong Fang¹, Vladimir Stankovic², Samuel Cheng³, and En-hui Yang⁴</i> | |
| ¹ Chang'an University, China, ² University of Strathclyde, ³ University of Oklahoma, ⁴ University of Waterloo | |
| Higher-Order Count Sketch: Dimensionality Reduction that Retains Efficient Tensor Operations | 394 |
| <i>Yang Shi¹ and Animashree Anandkumar²</i> | |
| ¹ Rakuten Institute of Technology, ² California Institute of Technology | |
| A High Efficient Cascade Coder with Predictor Blending Method for Lossless Audio Compression..... | 395 |
| <i>Grzegorz Ulacha and Cezary Wernik</i> | |
| West Pomeranian University of Technology in Szczecin | |
| A QD&JND Compensation Based PVC Scheme for HEVC | 396 |
| <i>Hongkui Wang¹, Li Yu¹, Xiatao Tang², Haibing Yin³, and Junhui Liang¹</i> | |
| ¹ Huazhong University of Science and Technology, ² Zhejiang Special Equipment Research Institute, ³ Hangzhou Dianzi University | |
| Light Field Image Compression Using Multi-branch Spatial Transformer Networks Based View Synthesis | 397 |
| <i>Jin Wang¹, Qianwen Wang¹, Ruiqin Xiong², Qing Zhu¹, and Baocai Yin³</i> | |
| ¹ Beijing University of Technology, ² Peking University, ³ Dalian University of Technology | |
| Densely Connected Unit Based Loop Filter for Short Video Coding | 398 |
| <i>Shengwei Wang, Peidi Yi, Hongkui Wang, and Li Yu</i> | |
| Huazhong University of Science and Technology | |
| Deep Clustering of Compressed Variational Embeddings | 399 |
| <i>Suya Wu¹, Enmao Diao¹, Jie Ding², and Vahid Tarokh¹</i> | |
| ¹ Duke University, ² University of Minnesota Twin Cities | |
| Binary Representation and High Efficient Compression of 3D CNN Features for Action Recognition | 400 |
| <i>Peiyin Xing¹, Peixi Peng¹, Yongsheng Liang², Tiejun Huang¹, and Yonghong Tian^{1,3}</i> | |
| ¹ Peking University, ² Harbin Institute of Technology, ³ Pengcheng Laboratory | |
| Improved Hard-Decision Quantization with Decision Tree for HEVC Video Compression | 401 |
| <i>Motong Xu and Byeungwoo Jeon</i> | |
| Sungkyunkwan University | |
| Spatial-Temporal Fusion Convolutional Neural Network for Compressed Video Enhancement in HEVC..... | 402 |
| <i>Xiaoyu Xu, Jian Qian, Li Yu, Hongkui Wang, Hao Tao, and Shengju Yu</i> | |
| Huazhong University of Science and Technology | |

| | |
|---------------------------------------------------------------------------------------------------------------------------|-----|
| Adaptive Stream-Based Entropy Coding | 403 |
| <i>Shinichi Yamagiwa, Eisaku Hayakawa, and Koichi Marumo</i> | |
| University of Tsukuba | |
| An Adaptive Quantization Based PVC Scheme for HEVC | 404 |
| <i>Hailang Yang, Hongkui Wang, Li Yu, Junhui Liang, and Tiansong Li</i> | |
| Huazhong University of Science and Technology | |
| Fast CU Size Decision Using Machine Learning for Depth Map Coding in 3D-HEVC | 405 |
| <i>Ruyi Zhang, Kebin Jia, and Pengyu Liu</i> | |
| Beijing University of Technology | |
| Linear Model Based Geometry Coding for Lidar Acquired Point Clouds | 406 |
| <i>Xiang Zhang, Wen Gao, and Shan Liu</i> | |
| Tencent America | |
| Wide and Deep Learning for Video Summarization via Attention Mechanism and Independently Recurrent Neural Network..... | 407 |
| <i>Juanping Zhou and Lu Lu</i> | |
| South China University of Technology | |
| Fixed-Length Coding for Escape Samples in Palette Mode | 408 |
| <i>Weijia Zhu¹, Jizheng Xu¹, Li Zhang¹, and Yue Wang²</i> | |
| ¹ Bytedance Inc., ² Beijing Bytedance Network Technology | |
| Author Index..... | 409 |