For further information see: www.cs.brandeis.edu/~dcc

PROGRAM
Data Compression Conference (DCC 2001)

(Sponsored by Brandeis University in Cooperation with the IEEE Computer Society TCCC; proceedings published by the IEEE Computer Society Press.)

Snowbird, Utah
March 27 - 29, 2001

COMMITTEE:
J. Storer, Brandeis U. *(Conference Chair)*
M. Cohn, Brandeis U. (*Program Chair*)
A. Apostolico (Purdue/Padova)
R. Arps (IBM)
B. Carpentieri (U. Salerno)
P. Chou (Microsoft)
M. Effros (CalTech)
H. Jafarkhani (Broadcom)
J. Kovacevic (Bell Labs)
R. Ladner (U. Washington)
M. Marcellin (U. Arizona)
A. Moffat (U. Melbourne)
D. Neuhoff (U. Michigan)
M. Rabbani (Kodak)
K. Ramchandran (U. Illinois)
E. Riskin (U. Washington)
S. Savari (Bell Labs / Lucent)
G. Seroussi (HP Labs)
J. Villasenor (UCLA)
I. Witten (U. Waikato)
K. Zeger (UC San Diego)

SCHEDULE OVERVIEW:

Monday Evening, March 26:
Registration and Reception

Tuesday, March 27:
Morning: Technical Sessions
Mid-Day: Invited Presentation
Afternoon: Technical Sessions

Wednesday, March 28:
Morning: Technical Sessions
Mid-Day: Technical Sessions
Afternoon: Poster Session and Reception

Thursday, March 29:
Morning: Technical Sessions

MONDAY EVENING

Registration / Reception, 7:00-10:00pm (Golden Cliff Room)

TUESDAY MORNING

Welcome: 7:45am

Session 1: 8:00am - 10:00am

8:00am
On Zador's Entropy-Constrained Quantization Theorem
R. Gray, J. Li
Stanford University, The Pennsylvania State University

8:20am
Network Vector Quantization
M. Fleming, M. Effros
California Institute of Technology

8:40am
Design of Tree-Structured Multiple Description Vector Quantizers
J. Cardinal
Universite Libre de Bruxelles

9:00am
Robust Predictive Vector Quantizer Design
H. Khalil, K. Rose
University of California at Santa Barbara

9:20am
Asymptotically Optimal Scalable Coding for Minimum Weighted Mean Square Error
A. Aggarwal, S. L. Regunathan, K. Rose
University of California at Santa Barbara

9:40am
Lossless Image Data Sequence Compression Using Optimal Context Quantization
S. Forchhammer, X. Wu, J. D. Andersen
Technical University of Denmark, University of Western Ontario

Break: 10:00am - 10:20am

(TUESDAY MORNING CONTINUED)

Session 2: 10:20am - 12:20pm

10:20am
Enhancing Analog Image Transmission Systems Using Digital Side Information:
A New Wavelet-Based Image Coding Paradigm
S. S. Pradhan, K. Ramchandran
University of California at Berkeley

10:40am
Group Testing for Wavelet Packet Image Compression
E. S. Hong, R. Ladner, E. A. Riskin
University of Washington

11:00am
Embedded Image Coding Using Zero Blocks of Subband/Wavelet Coefficients
and Context Modeling
S. Hsiang
Rensselaer Polytechnic Institute

11:20am
A Wavelet Coder for Masked Images
P. Simard, H. Malvar
Microsoft Research

11:40am
Feature-Preserving Image Coding for Very Low Bit Rates
D. Schilling, P. Cosman
University of California at San Diego

12:00noon
Video Residual Coding Using SPIHT and Dependent Optimization
and
Rate-Distortion Optimization for the SPHIT Encoder
K. K. Lin, R. M. Gray
Stanford University

Lunch Break: 12:20pm - 2:30pm

INVITED PRESENTATION, 2:30pm - 3:30pm

"Digital Geometry Compression"

Dr. Wim Sweldens, Lucent Technologies, Murray Hill, NJ

Abstract: Due to rapid progress in scanning technology, digital geometry is becoming the fourth wave of digital multimedia after audio, images, and video. Last year, a two billion triangle model of Michelangelo's David with sub millimeter accuracy was built. As a result, digital geometry compression has established itself as a new branch of data compression. Traditionally one observes that meshes consist both of geometric information (vertex positions) and connectivity or graph information. Compression methods for both geometry and connectivity have been proposed. In this work, we observe that meshes actually consist of three distinct components: geometry, parameter, and connectivity information. More importantly, the latter two do not contribute to the reduction of error in a rate-distortion setting. We show that using so-called semi-regular meshes, parameter and connectivity information can be eliminated. Combined with wavelet transforms, zerotree coding, and subdivision, we build a progressive geometry compression algorithm which improves the standard methods by 12dB.

TUESDAY AFTERNOON

Session 3: 4:00pm - 5:20pm

4:00pm
Length-Restricted Coding in Static and Dynamic Frameworks
M. Liddell, A. Moffat
The University of Melbourne

4:20pm
Optimal Prefix-Free Codes that End in a Specified Pattern and Similar Problems:
the Uniform Probability Case
M. J. Golin, H. Na
Hong Kong University of Science and Technology, Postech

4:40pm
Combining PPM Models Using a Text Mining Approach
W. J. Teahan, D. J. Harper
The Robert Gordon University

5:00pm
Compressing XML with Multiplexed Hierarchical PPM Models
J. Cheney
Cornell University

Break: 5:20pm - 5:40pm

Session 4: 5:40pm - 7:00pm

5:40pm
Quantized Oversampled Filter Banks with Erasures
P.L. Dragotti, J. Kovacevic, V.K. Goyal,
Swiss Federal Institute of Technology, Bell Labs, Lucent Technologies

6:00pm
Semidefinite Programs for the Design of Codes
for Delay-Constrained Communication in Networks
F.E. Oggier, S.D. Servetto
Universite de Geneve, Ecole Polytechnique Federale de Lausanne

6:20pm
Construction of Low Complexity Regular Quantizers for Overcomplete Expansions in R^N
B. Beferull-Lozano, A. Ortega
University of Southern California

WEDNESDAY MORNING

Session 5: 8:00am - 10:00am

8:00am
Towards Compressing Web Graphs
M. Adler, M. Mitzenmacher
University of Massachusetts, Harvard University

8:20am
Compressing the Graph Structure of the Web
T. Suel, J. Yuan
Polytechnic University

8:40am
Streaming Thin Client Compression
B.O. Christiansen, K.E. Schauser, M. Munke
University of California at Santa Barbara

9:00am
Software Compression in the Client/Server Environment
M. Factor, D. Sheinwald, B. Yassour
IBM Research

9:20am
Tag Insertion Complexity
S. Yeates, I.H. Witten, D. Bainbridge
University of Waikato

9:40am
Fast Adaptive Encoder for Bi-Level Images
H. S. Malvar
Microsoft Research

Break: 10:00am - 10:20am

(WEDNESDAY MORNING CONTINUED)

Session 6: 10:20am - 12:20pm

10:20am
Optimal Code Design for Lossless and Near Lossless Source Coding
in Multiple Access Networks
Q. Zhao, M. Effros
California Institute of Technology

10:40am
On Variable Length Codes for Iterative Source/Channel Decoding
R. Bauer, J. Hagenauer
Munich University of Technology

11:00am
Joint Source-Channel Decoding of Correlated Sources over Noisy Channels
J. Garcia-Frias
University of Delaware

11:20am
Successive Refinement on Trees: A Special Case of a New MD Code Region
R. Venkataramani, G. Kramer, V. Goyal
University of Illinois, at Urbana-Champaign, Bell Labs, Lucent Technologies

11:40am
Joint Source Channel Coding Using Arithmetic Codes and Trellis Coded Modulation
C. Demiroglu, M. W. Hoffman, K. Sayood
University of Nebraska-Lincoln

12:00noon:
Low Delay Perceptually Lossless Coding of Audio Signals
S. Dorward, D. Huang, S. A. Savari, G. Schuller, B. Yu
Bell Labs, Lucent Technologies, University of California at Berkeley

Lunch Break: 12:20pm - 2:00pm

WEDNESDAY MID-DAY

Session 7: 2:00pm - 3:20pm

2:00pm
Enhancing Image Coders By Using Spatial Noise Shaping (SNS)
S.Kuo, J.D. Johnston
AT&T Labs-Research

2:20pm
Compression of the Layered Depth Image
J. Duan , J. Li
Tsinghua University, Microsoft Research China

2:40pm
Multihypothesis Motion Estimation for Video Coding
M. Flierl, B. Girod
University of Erlangen-Nuremberg, Stanford University

3:00pm
Managing Drift in DCT-Based Scalable Video Coding
A.R. Reibman, L. Bottou
AT&T Labs – Research

POSTER SESSION AND RECEPTION

4:00-7:00pm

In the Golden Cliff Room

(Titles are listed later in this program; abstracts of each presentation appear in the proceedings.)

THURSDAY MORNING

Session 8: 8:00am - 10:00am

8:00am
Design of Trellis Codes for Source Coding with Side Information at the Decoder
X. Wang, M. T. Orchard
Princeton University

8:20am
Universal Lossless Compression of Piecewise Stationary Slowly Varying Sources
G.I. Shamir, D.J. Costello, Jr.
University of Notre Dame

8:40am
The Coding-Optimal Transform
C. Archer, T. K. Leen
Oregon Graduate Institute of Science and Technology

9:00am
An Adaptable Binary Entropy Coder
A. Kiely, M. Klimesh
NASA Jet Propulsion Laboratory

9:20am
Overlap in Adaptive Vector Quantization
F. Rizzo, J. A. Storer
Brandeis University

9:40am
On the Hardness of Finding Optimal Multiple Preset Dictionaries
M. Mitzenmacher
Harvard University

Break: 10:00am - 10:20am

(THURSDAY MORNING CONTINUED)

Session 9: 10:20am - 12:20pm

10:20am
Can We Do without Ranks in Burrows Wheeler Transform Compression
A. Wirth, A. Moffat,
The University of Melbourne

10:40am
Parsing Strategies for BWT Compression
R. Y. K. Isal, A. Moffat
The University of Melbourne

11:00am
Space-time Tradeoffs in the Inverse B-W Transform
J. Seward
Microsoft Research

11:20am
Pattern Matching in Huffman Encoded Texts
S.T. Klein, D. Shapira
Bar-Ilan University, Jordan Valley College

11:40am
Faster Approximate String Matching Over Compressed Text
G. Navarro, T. Kida, M. Takeda, A. Shinohara, S. Arikawa
University of Chile, Kyushu University

12:00noon
Compressed Pattern Matching SEQUITUR
S. Mitarai, M. Hirao, T. Matsumoto, A. Shinohara, M. Takeda, S. Arikawa
Kyushu University, Japan Science and Technology Corporation

*** POSTERS ***
(listed alphabetically by first author)

LIPT: A Reversible Lossless Text Transform to Improve Compression Performance
F. S. Awan, N. Zhang, N. Motgi, R.T. Iqbal, A. Mukherjee
University of Central Florida

Architecture for Efficient Implementation of the YK Lossless Data Compression Algorithm
A. Banerji, S. Goel
Hughes Network Systems

Lossless Compression for Satellite Packet Networks Using the YK Algorithm
A.Banerji, D. Dillon
Hughes Network Systems

Noisy Image Compression:
A Comparison of Wavelets, Multiwavelets, Wavelet Packets, and Multiwavelet Packets
A.P. Beegan, A.E.Bell
Virginia Tech

On Parent-Child Coding Gain in Zero-Tree Based Coders
A. Bilgin, M. W. Marcellin
The University of Arizona

Improving Wavelet Compression with Neural Works
C. J. C. Burges, P. Y. Simard, H. S. Malvar
Microsoft Research

Error-Resilient Block Sorting
L. Butterman, N. Memon
Stuyvesant High School, Brooklyn Polytechnic University

FEC-Based Wireless Video Streaming with Pre-Interleaving
J. Cai, C. W. Chen
University of Missouri at Columbia

An Efficient Data Embedding Algorithm for H.263 Compatible Video Coding
P. C. Chang, T.-H. Wang, T. H. Lee
National Central University

Feature Difference Classification in Fractal Image Coding
Y. Chen and F. Zhang
Nanjing University

Fast Vertex Transformation for 3D Rendering through Predictive Vector Quantization
P.H. Chou, T. H. Meng
Stanford University

LZ1 Compression of Binary Images using a Simple Rectangle Greedy Matching Technique
L. Cinque, E. Grande, S. De Agostino
University of Rome, Armstrong Atlantic University

Video Coding for Streaming Media Delivery on the Internet
G.J. Conklin, G.S. Greenbaum, K.O. Lillevold, A.F. Lippman, Y.A. Reznik
RealNetworks, Inc.

The Qualitative Modeling and Compression of the Request Sequences in ARQ Protocols
N. Ekstrand, B. Rathonyi, Y. Shtarkov, B. Smeets
Lund University, Ericsson Mobile Communication AB, IITP Russian Academy of Sciences

A Posteriori Quantized Matching Pursuit
P. Frossard, P. Vandergheynst
Swiss Federal Institute of Technology

Real-Time Decompression of Streaming Video Using Mobile Code
A. Grama, Meyer, W. Szpankowski
Purdue University

A Comparison Between Two Error Detection Techniques Using Arithmetic Coding
B. He, C.N. Manikopoulos
New Jersey Institute of Technology

Edge-Based Artifact Mitigation in a Wavelet Transform Coding Framework
A. Kalyanaraman, P. Flynn
The Ohio State University

Just-In-Time Browsing for Digital Images
D. J. Kennard, W. A. Barrett
Brigham Young University

Lossless Fast Full Search Algorithm in Motion Estimation
Using Various Matching Scans from Image Localization
J. N. Kim, S. C. Byun, B.H. Ahn
Kwangju Institute of Science and Technology

Improving Binary Coding for Prediction-Based Text Compression
G. Lakhani
Texas Tech University

Compror: Compression With a Factor Oracle
A. Lefebvre, T. Lecroq
Université de Rouen

Glicbawls – Grey Level Image Compression By Adaptive Weighted Least Squares
B. Meyer, P. Tischer
Monash University

TMW $^{\text{Lego}}$ – An Object Oriented Image Modelling Framework
B. Meyer, P. Tischer
Monash University

Application of Directional Wavelets to Image Compression
K. Miettinen
Eastman Kodak Company

Adaptive and Proadaptive Image Compression
V. N. Oulianov
Tomsk State University of Control Systems and Radioelectronics

Delta Encoding of Related Web Pages
Z. Ouyang, N. Memon, T. Suel
Brooklyn Polytechnic University

Multiple Description Coding Using Exact Discrete Radon Transform
B. Parrein, N. Normand, J. P. Guédon
Image Vidéo Communication Team - EPUN

An Optimizing Lossy Generalization of LZW
S. Pigeon
Universite de Montreal

Masked Wavelets: Applications to Image Compression
S. Pigeon, L. Bottou
Universite de Montreal, AT&T Research

Start/Stop Codes
S. Pigeon
Universite de Montreal

Unconstrained Vector Length in Fast Wavelet Transforms
S. Pigeon
Universite de Montreal

Lower Bounding the Optimal LZ78–Parsing
M. S. Pinho, W. A. Finamore
Universidade Estadual Paulista, Pontificia Universidade Catolica

JPEG Compressed Domain Image Retrieval by Colour and Texture
G. Schaefer
University of East Anglia

Image Compression Using Blocksort
M. Schindler, B. Sebastian
Intelligent Compression Technologies

Better Text Compression from Fewer Lexical n-Grams
T .Smith, M .Lorenz
University of Waikato

Adaptive Quantization for Lossy Image Compression Controlled by Noise Detection
T. Strutz
University of Rostock

Source Coding With Minimal and Rate-Independent Search and Memory Complexity
A.D. Subramaniam, B.D. Rao
University of California at San Diego

Complexity–Distortion Optimal Search Algorithm for Block Motion Estimation
P. L. Tai, C. T. Liu, J. S. Wang
Taiwan National Tsing Hua University

Deterministic Chaos and Information Theory
M. Titchener, W. Ebeling
University of Auckland, Humboldt University

Flexible Storage of Images for Digital Cameras
R. van der Vleuten, R. Kleihorst, C. Hentschel
Philips Research Laboratories

Error Detection by Parity Checks for H.263 Compatible Video Coding
T. Wang, T. Lee, P. Chang
Taiwan National Central University

Error Resilient Packet Video With Unequal Error Protection
Y. Wang, M.D. Srinath
Southern Methodist University

Mapping of Pruned Tree-Structured Scalar Quantizers to Companding: A Design Strategy
J. Wilson
University of Colorado

Code Compression for VLIW Processors
Y. Xie, H. Lekatsas, W. Wolf
Princeton University, NEC USA

A New Lossless Image Compression Scheme for Medical Images by Hierarchical Segmentation
M. Yamauchi, A. Wakatani
Matsushita Electric Industrial Co., Konan University

Compression of Full Parallax Color Integral 3D TV Image Data
Based on Sub-Sampling of Chrominance Components
R. Zaharia, A. Aggoun, M. McCormick
De Montfort University

Morphological Representation of DCT Data for Image Coding
D. Zhao, Y.K. Chan, W. Gao
Harbin Institute of Technology, City University of Hong Kong

MSSBM and Its Application to Nature Image Coding
Y. Zhao, B. Yuan
Northern Jiaotong University

Optimal Protection for Progressive Image Transmission over Noisy Channels:
A General Approach
M. Zhao, A. Akansu
New Jersey Institute of Technology