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

ADVANCE PROGRAM

Data Compression Conference (DCC'97)

(Sponsored by the IEEE Computer Society TCCC)

Snowbird, Utah
March 25 - 27, 1997

GENERAL CHAIR: J. Storer, Brandeis U.
PROGRAM CHAIR: M. Cohn, Brandeis U.
PROGRAM COMMITTEE: R. Arps (IBM), T. Bell (U. Canterbury), B. Carpentieri (U. Salerno), M. Cohn (Brandeis U.), M. Effros (CalTech), P. Howard (AT&T), R. Gray (Stanford), A. Jacquin (Lucent Tech., Bell Labs), A. Kiely (NASA), G. Langdon (UC Santa Cruz), A. Lempel (Technion), A. Moffat (U. Melbourne), K. Ramchandran (U. Illinois), J. Reif (Duke U.), R. Renner (Ball Aerospace), E. Riskin (U. Washington), A. Rodriguez (Sci. Alanta), J. Storer (Brandeis U.), G. Sullivan (PictureTel), J. Villasenor (UCLA), J. Vitter (Duke U.), I. Witten (U. Waikato), K. Zeger (UC San Diego), J. Ziv (Technion)

THEME: An international forum for current work on data compression and related areas. Topics of interest include but are not limited to: Source coding, quantization theory, parallel compression algorithms and hardware, lossless and lossy compression algorithms for specific types of data (including text, images, video, speech, music, maps, instrument data, graphics, animation, and bit-maps), data compression standards, bi-level coding, transform methods, wavelet and fractal techniques, string searching and manipulation, closest-match retrieval, minimal length encoding and applications to learning, system issues relating to data compression (including error control, data security, indexing, and browsing), medical imagery, scientific and space data.

SCHEDULE OVERVIEW:

Monday, March 24: Industry Workshop

Monday Evening, March 24: Registration and Reception

Tuesday, March 25:
Morning: Technical Sessions
Mid-Day: Invited Presentation
Afternoon: Technical Sessions

Wednesday, March 26:
Morning: Technical Sessions
Mid-Day: Invited Presentation
Afternoon: Poster Session and Reception

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

MONDAY EVENING

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

TUESDAY

Welcome: 7:45am

Session 1: 8:00am - 10:05am

8:00am
"Linear-time, Incremental Hierarchy Inference for Compression"
Craig G. Nevill-Manning, Ian H. Witten
Stanford University, University of Waikato

8:25am
"Models of English Text"
W. J. Teahan, John G. Cleary
University of Waikato

8:50am
"Towards Understanding and Improving Escape Probabilities in PPM"
J Aberg, Yu. M. Shtarkov, B. J. M. Smeets
Lund University, Russian Academy of Sciences

9:15am
"A Percolating State Selector for Suffix-Tree Context Models"
Suzanne Bunton
University of Washington

9:40am
"An Executable Taxonomy of On-Line Modeling Algorithms"
Suzanne Bunton
University of Washington

Break: 10:05am - 10:30am

Session 2: 10:30am - 12:35pm

10:30am
"An Analytical Treatment of Channel-Induced Distortion in Run Length Coded Image Subbands"
Javier Garcia-Frias, John D. Villasenor
University of California at Los Angeles

10:55am
"Capturing Global Redundancy to Improve Compression of Large Images"
Barbara L. Kess, Stephen E. Reichenbach
University of Nebraska-Lincoln

11:20am
"Progressive Image Coding on Noisy Channels"
P. Greg Sherwood, Kenneth Zeger
University of California at San Diego

11:45am
"Multimode Image Coding for Noisy Channels"
Shankar L. Regunathan, Kenneth Rose, Shrinivas Gadkari
University of California

12:10pm
"L-Constrained High-Fidelity Image Compression via Adaptive Context Modeling"
Xioalin Wu, Wai Kin Choi, Paul Bao
University of W. Ontario, Chinese University of Hong Kong, Hong Kong Polytechnic University

Lunch Break: 12:35pm - 2:30pm

Mid-Day Invited Presentation: 2:30pm - 3:35pm

Break: 3:35pm - 4:00pm

Session 3: 4:00pm - 5:15pm

4:00pm
"A Lexicographic Framework for MPEG Rate Control"
Dzung T. Hoang, Elliot L. Linzer, Jeffrey S. Vitter
Digital Video Systems Inc, C-Cube Microsystems, Duke University

4:25pm
"Content-Adaptive Postfiltering for Very Low Bit Rate Video"
Arnaud Jacquin, Hiroyuki Okada, Paul Crouch
Lucent Technologies, Sharp Corporation, AT&T Corporation

4:50pm
"Library-based Coding: a Representation for Efficient Video Compression and Retrieval"
Nuno Vasconcelos, Andrew Lippman
MIT Media Laboratory

Break: 5:15pm - 5:40pm

Session 4: 5:40pm - 6:55pm

5:40pm
"On Adaptive Strategies for an Extended Family of Golomb-type Codes"
Gadiel Seroussi, Marcelo J. Weinberger
Hewlett-Packard Laboratories

6:05pm
"An Iterative Technique for Universal Lossy Compression of Individual Sequences"
Daniel Manor, Meir Feder
Tel Aviv University

6:30pm
"Significantly Lower Entropy Estimates for Natural DNA Sequences"
David Loewenstern, Peter N. Yianilos
Rutgers University, NEC Research Institute

WEDNESDAY

Session 5: 8:00 - 10:05

8:00am
"Text Compression Via Alphabet Re-Representation"
Philip M. Long, Apostol I. Natsev, Jeffrey S. Vitter
National University of Singapore, Duke University

8:25am
"Low-Cost Prevention of Error Propagation for Data Compression with Dynamic Dictionaries"
James A. Storer and John H. Reif
Brandeis University, Duke University

8:50am
"Block Sorting and Compression"
Ziya Arnavut, Spyros S. Magliveras
University of Nebraska

9:15am
"Redundancy of the Lempel-Ziv-Welch Code"
Serap A. Savari
Lucent Technology

9:40am
"A Corpus for the Evaluation of Lossless Compression Algorithms"
Ross Arnold, Tim Bell
University of Canterbury

Break: 10:05am - 10:30am

Session 6: 10:30am - 12:35Pm

10:30am
"Fast Weighted Universal Transform Coding:
"Toward Optimal, Low Complexity Bases for Image Compression"
Michelle Effros
California Institute of Technology

10:55am
"Image Coding Based on Mixture Modeling of Wavelet Coefficient
and a Fast Estimation-Quantization Framework"
Scott M. LePresto, Kannan Ramchanran, Michael T. Orchard
University of Illinois at Urbana-Champaign

11:20am
"Universal Transform Coding Based on Backward Adaptation"
Vivek K. Goyal, Jun Zhuang, Martin Vetterli
University of California at Berkeley

11:45am
"Efficient Context-Based Entropy Coding Lossy Wavelet Image Compression"
Christos Chrysafis, Antonio Ortega
University of Southern California

12:10pm
"An Embedded Wavelet Video Coder
Using Three-Dimensional Set Partitioning in Hierarchical Trees (SPIHT)"
Beong-Jo Kim, William A. Pearlman
Rensselaer Polytechnic Institute

Lunch Break: 12:35pm - 2:30pm

Mid-Day Invited Presentation: 2:30pm - 4:00pm

POSTER SESSION AND RECEPTION

4:00-7:00pm
In the Golden Cliff Room

(Abstracts of each presentation appear in the proceedings.)

THURSDAY

Session 7: 8:00am - 10:05am

8:00am
"Optimal Fractal Coding is NP-Hard"
Matthias Ruhl, Hannes Hartenstein
Universitat Freiburg

8:25am
"Fast and Compact Volume Rendering in the Compressed Transform Domain"
Sefeng Chen and John H. Reif
Duke University

8:50am
"Compression of Functions Defined on Surfaces of 3D Objects"
Krasimir Kolarov, William Lynch
Interval Research Corporation,

9:15am
" On Maximal Parsings"
Martin Cohn, Harold Helfgott
Brandeis University

9:40am
"A Codebook Generation Algorithm for Document Image Compression"
Qin Zhang, John M. Danskin, Neal Young
Dartmouth College

Break: 10:05am - 10:30am

Session 8: 10:30am - 12:35pm

10:30am
"A Fixed-Rate Quantizer Using Block-Based Entropy-Constrained Quantization and Run-Length Coding"
Dongchang Yu, Michael W. Marcellin
Oak Technology Inc, University of Arizona

10:55am
"Adaptive Vector Quantization Using Generalized Threshold Replenishment"
James E. Fowler, Stanley C. Ahalt
Ohio State University

11:20am
"Quadtree Based Variable Rate Oriented Mean Shape-Gain Vector Quantization"
Raouf Hamzaoui, Bertram Ganz, Dietmar Saupe
Universitat Freiburg

11:45am
"Entropy-Constrained Successively Refinable Scaler Quantization"
Hamid Jafarkhani, Hugh Brunk, Nariman Farvardin
University of Maryland

12:10pm
"Conditional Entropy Coding of VQ Indexes for Image Compression"
Xiaolin Wu, Jiang Wen, Wing Hung Wong
University of W. Ontario, Chinese University of Hong Kong, UCLA

Lunch Break: 12:35pm - 2:30pm

Mid-Day Invited Presentation: 2:30pm - 3:35pm

Break: 3:35pm - 4:00pm

Session 9: 4:00pm - 5:15pm

4:00pm
"Efficient Approximate Adaptive Coding"
Andrew Turpin, Alistair Moffat
University of Melbourne

4:25pm
"An Overhead Reduction Technique For Mega-State Compression Schemes"
Abraham Bookstein, Shmuel T. Klein, Timo Raita
University of Chicago, Bar-Ilan University, University of Turku

4:50pm
"Text Compression by Context Tree Weighting"
J Aberg, Yu. M. Shtarkov
Lund University, Russian Academy of Sciences

Break: 5:15pm - 5:40pm

Session 10: 5:40pm - 6:55pm

5:40pm
"Image Coding Using Optimized Significance Tree Quantization"
Geoffrey M. Davis, Sumit Chawla
Dartmouth College

6:05pm
"Fast Residue Coding for Lossless Textual Image Compression"
Corneliu Constantinescu, Ronald Arps
IBM Almaden Research Center

6:30pm
"A Remapping Technique Based on Permutations
for Lossless Compression of Multispectral Images"
Ziya Arnavut
University of Nebraska at Omaha

Mid-Day Presentations

Tuesday:

Tom Cover

Stanford University

"Data Compression and Investment"

Abstract: The relationship between gambling and data compression can be extended to universal gambling schemes and universal data compression. Recent joint work with Erik Ordentlich seems to show that minimax regret investment theory results in the same strategies as minimax regret data compression. One simply identifies betting mass with probability mass. Thus results in universal data compression can be used to develop universal investment algorithms. Some examples of performance of these algorithms on the market will be provided.

Wednesday:

Barry Haskell

Bell Laboratories

"Happenings in ISO MPEG: An Introduction to MPEG-4"

Abstract: Following its very successful audio/video coding standards MPEG-1 and MPEG-2, the ISO Moving Picture Experts Group (MPEG) has embarked on an ambitious new effort dubbed MPEG-4. Many promises have been made for MPEG-4, including better audio and video compression, coding of objects in scenes instead of the scenes themselves, hybrid synthetic-natural audio-, and finally a C++ like language that will allow downloading of software for customized algorithms and applications. Meanwhile, the ITU-T has nearly completed its H.323, which enables multipoint communication on LANs, InterNet, Switched Lines or all three. And the IETF is pushing its RTP, RTCP, RSVP, etc. for real time InterNet communication. What's happening? Where's all this going? Will it ever end? We hope to answer these and other questions.

Thursday:

Mike Marcellin

University of Arizona

"JPEG: Past, Present, and Future"

Abstract: The presentation will begin with a review of the relationships among the various bodies that comprise the image compression standardization effort. A brief history of previous work performed by these groups (JPEG and JBIG) will follow. The talk will then move into ongoing work, including lossless and lossy binary image compression (JBIG-2) and a new lossless and near-lossless continuous-tone compression algorithm (JPEG-LS). The talk will conclude with the committee's vision for a future lossy (and lossless?) continuous-tone image compression algorithm (JPEG-2000).